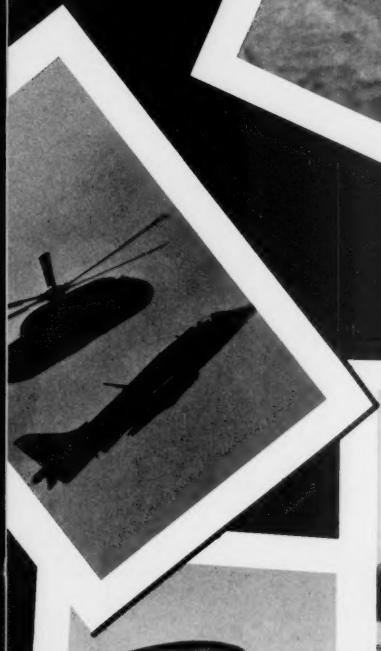

AIR-TO-AIR THE MARINE CORPS WAY

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JULY 1982 • VOLUME 28 • NUMBER 7

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Honorable John O. Marsh Jr.
Secretary of the Army

Richard K. Tierney
Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

The *Digest* is an official Department of the Army periodical published monthly under the supervision of the Commanding General, U.S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army nor the U.S. Army Aviation Center. Photos are U.S. Army unless otherwise specified. Use of the masculine pronoun is intended to include both genders unless otherwise stated. Material may be reprinted provided credit is given to the *Digest* and to the author unless otherwise indicated.

Articles, photos, and items of interest on Army Aviation are invited. Direct communication is authorized to Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Fort Rucker, AL 36362. Manuscripts returned upon request.

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his month marks the 206th year of our Nation's independence and our memory of that struggle should be just as vivid today as it was for American Patriots two centuries ago. The preservation of that independence and our heritage of freedom are in our hands today and Army Aviation plays a critical role in the preservation.

Training and readiness are the responsibilities of each of us in the force as we maintain our preparedness to meet contingencies and national commitments world-wide. Likewise, we must identify our shortcomings and seek improvements in those areas wherein we find ourselves deficient, be they in materiel, training, tactics or operations. One of those of increasing importance is our preparation for air-to-air helicopter self-defense. "Victory in Air-to-Air Combat, the Marine Corps Way" by Betty J. Goodson, *Digest* writer, highlights the fact that our sister service has acknowledged that aerial engagements between rotary wing aircraft appear to be inevitable. Further, it details for us how the Marines are preparing for that inevitability. We appreciate the willingness of Colonel B. G. Butcher and his staff at the Marine Aviation Weapons and Tactics Squadron-One to share this information with the Army Aviation community.

Likewise, the topic of air-to-air operations is one of several addressed in "Army Aviation Systems Program Review-1982, Concepts, Doctrine and Tactics Panel" by Lieutenant General Jack V. Mackmull, panel chairman, and Captain Josef Reinsprecht. The authors very ably discuss the many concepts, doctrine and tactics issues considered by the panel members and the ensuing recommendations they presented during the 1982 AASPR. You will note that the issues are quite substantive and represent a myriad of areas wherein the overall effectiveness of Army Aviation can be greatly enhanced.

And concern for training to meet all contingencies was equally well recognized as a fundamental necessity by our early Army Aviation pioneers. *Digest* Editor, Richard K. Tierney, makes that clear in his "Forty Years of Army Aviation, Part 2: Building a Training Program," which details the growth of that curriculum from 1942 to 1954. I think you will find it quite enlightening. Mr. Tierney's entire five part series, written for the Fortieth Birthday, has been compiled into a training text used by the students in the Aviation School as a part of their military history program.

Continuing on the theme of training, there is a fact that we in aviation learn and relearn the hard way, that no matter how outstanding the course of instruction an aviator receives, or how proficient he or she becomes, the training cannot be truly effective unless the gained knowledge is used! Safe flying depends on knowing what to do and then doing it in the proper way. Raymond P. Johnson in "When Will We Learn About Mountain Flying?" recounts several accidents that occurred because some people did not use the knowledge they had.

The accidents, their causes and their effects, described by Mr. Johnson are an absolute must for this month's reading. Do not put the magazine down until you have completed that article. In fact, turn to page 16 right now and begin reading in the middle of the magazine. Some of you may say, "there but for the grace of God, go I," and many of you can immediately recount similar tight spots in which you, your aircraft, your crew, your mission, were all placed in jeopardy by *your* actions. Our accident rate for FY 82 is living testimony to such actions. Already with only three-fourths of the year behind us, we have exceeded the number of FY 81 accidents, fatalities, aircraft lost and cost. And the sad part is that over 60 percent of those accidents were attributed to human error, be it the pilot, another crew member or the supervisor. Only 16 percent were attributed to mechanical or maintenance failure with environmental factors accounting for the balance. Thus, our aircraft are not letting us down, we are letting our aircraft down. Aviation safety is everyone's job. Read and heed. Accidents can be prevented and the next one which you prevent may well be yours.

We all live and learn by experience, the great teacher. But experience is not the teacher it can be unless it is shared with others. We provide you a forum to do just that, either through an article in this magazine or a letter to the editor. Let us hear from you on those things that concern you, on how we can improve Army Aviation or how you have met a particular challenge in your unit. But we especially want to share your thoughts and initiatives to improve our safety record. Only through all of us working together can we become independent of needless accidents. The Aviation School, with the best IP s and the best training in the business—and the Safety Center with the finest safety specialists in the Army, can't do it alone. It takes *YOU!*

Major General Carl H. McNair Jr.
Commander, U.S. Army Aviation Center Fort Rucker, AL

VICTORY IN AIR-TO-AIR COMBAT, THE MARINE CORPS WAY

US. MARINES run from the enemy? Taught to do so? That's heresy! EXCEPT—

There is nothing heretical about the instruction given at the Marine Aviation Weapons and Tactics Squadron-One (MAWTS-1), Yuma, AZ, with reference to air-to-air combat between helicopters. There, Marine rotary wing aviators are taught that evasive (read that "running") maneuvers are the best way for a helicopter

Betty J. Goodson
Staff Writer

From top to bottom: CH-53, CH-46, UH-1N, AH-1T

photographs by Harry Gunn, courtesy of McDonnell Douglas

and its crew to survive in a threat environment. Of course, the prime step is *to avoid* detection and engagement. If those do occur, however, then the task is to evade the threat by whatever means are available. Such action has a simple rationale: A live Marine can do more for his country than a dead one can!

Every aviator in the Corps' four aircraft wings cannot come to MAWTS-1. So Colonel B. G. Butcher, squadron commander, and his people do the next best thing as one of their major tasks: Twice a year they conduct a 7-week Weapons and Tactics Instructors (WTI) Course. Its goal is to provide one WTI and, in the case of crew-concept airplanes, one WTI crew per squadron per year. Course graduates then conduct the required professional individual and unit training programs for their squadrons.

The course curriculum covers the six functions of Marine aviation—aerial reconnaissance, antiair warfare, assault support, offensive air support, electronic warfare, and control of aircraft and missiles—for the 12 kinds of aircraft the Marines use. These include two conventional and seven jet fixed wings and four kinds of helicopters. The latter are the CH-53 Sea Stallion, CH-46 Sea Knight, UH-1 Huey and AH-1 Cobra; and the air-to-air segment of the WTI course for those aircraft is taught as a part of assault support.

STANDARDIZED EVASION

Majors Jim Pruden and Bob Garner of the Assault Support Branch are two who instruct the instructors to conduct training in a standardized manner throughout the Marine Corps.

"We teach evasive maneuvers (EVM) against the ground threat," Major Garner said, "and then we progress into EVM for one aircraft vs. one aircraft—helo vs. helo and helo vs. fixed wing. The next step is two vs. two, then two vs. many.

"These are specific maneuvers designed to put the helicopter in a position that prevents its being shot down. We run the students through these flights in a very controlled atmosphere; then we give them a couple of free engagements so they can practice what they've learned."

He noted that the maneuvers have to be amplified by other instructions.

Major Pruden explained: "The students have to learn how they should support each other and how to drive the fight the way they want it to go. That is the key to two vs. two or two vs. many—to drive the fight so the aircraft being attacked can possibly be supported by the other. Mutual support, in other words.

"In past air-to-air wars, aircraft that were shot down were usually attacked by an unseen adversary. This then teaches us that an extremely good lookout doctrine must be maintained by all aircrews to prevent that unforeseen shot. Establishing a good lookout doctrine requires crew coordination—getting everybody to work together. To keep it simple, all aircrews must use standard terminology in calling the threat so the pilot can understand explicitly what he is being told. Aircraft recognition is also vital, since at a distance it is not always easy to tell a friendly from a non-friendly. Further, our aircrews have to recognize what maneuvers the enemy is making to determine if he is really a threat to us at that particular time.

"All of this knowledge is essential to survival, but the key element is standardization—everybody understanding what the other person does, just the way he does. We believe in this because we know there will not be a lot of time in combat to ask questions and look for answers about procedures."

HOW TO USE EVM

Captain Hal Reeves, formerly of MAWTS-1 and now a helicopter projects officer with Air Test and Evaluation Squadron Five, Naval Weapons Center, China Lake, CA, gave more specific details on the Marine Corps' use of rotary wing aircraft and its preparation for air-to-air combat.

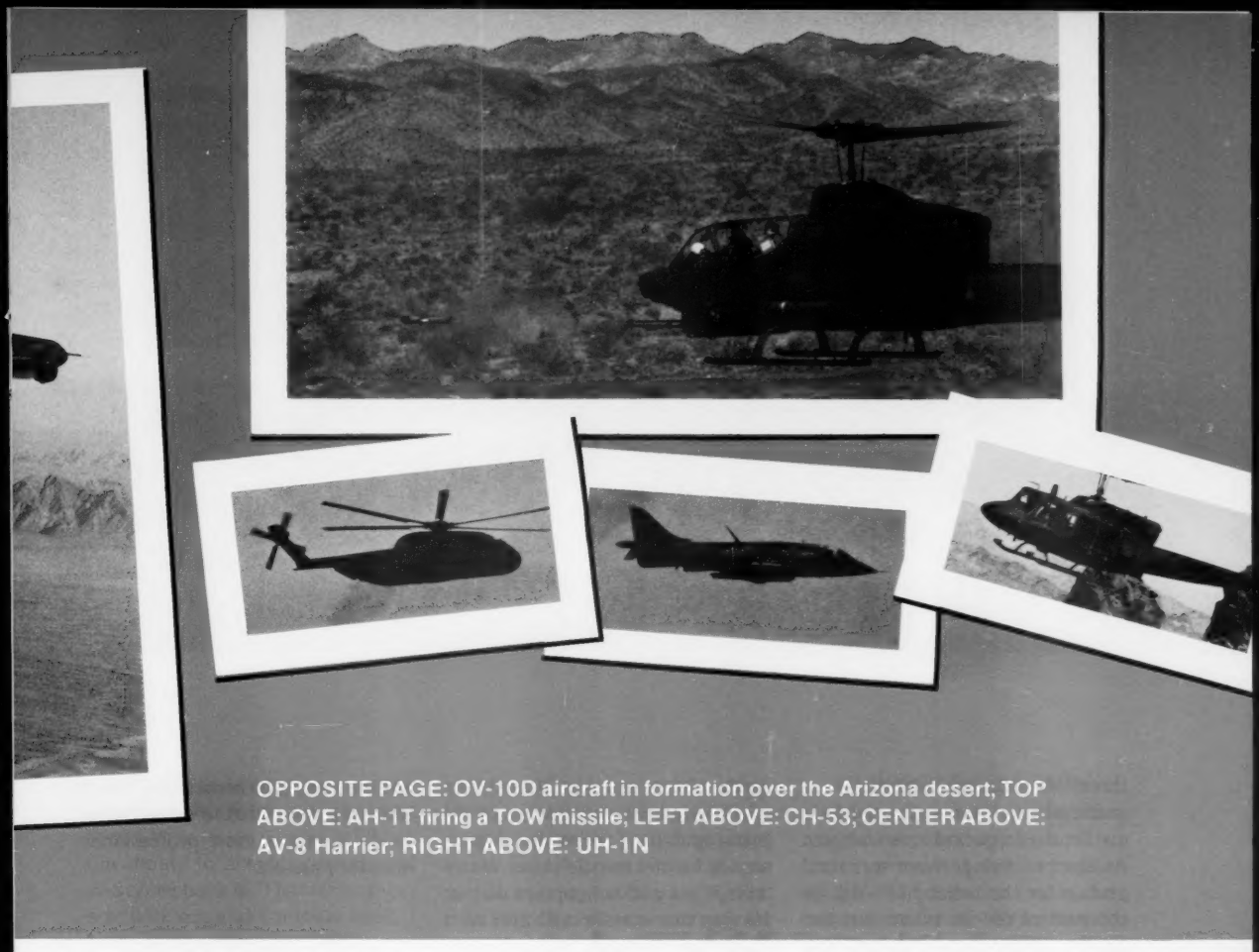
"We have a great asset in our transport helicopters, the CH-46 and CH-53, because we can carry 15 to 30 troops at a time and that means we have fewer assets committed for troops as well as supply movements, when compared to the Army. We primarily use our Cobras and OV-10 Broncos as escorts for those transports, with the Cobras providing the crucial part of that protection. So I want to talk primarily about the AH-1 role.

"When the Cobra is flying as the escort, we must keep our airspeed up at a good maneuvering speed

the majority of the time, where the terrain will allow. Now, assume I am flying a Cobra and am acquired by an attacking Hind helicopter at a range where I cannot turn around (without being an easy mark) or hide effectively. I cannot then disengage (outrun him) because of his superior airspeed and weapons range. In other words, if there is an attacker back here at 180 knots, and I am running away from him at 140 knots, and he is 1,000 meters out of his envelope to fire, my best option is to run straight away. If I am turning, etc., he is closing on me; and it is 140 knots against 180. At 40 knots of closure, it is going to take him only about 60 seconds to make up that 1,000 meters and be in his weapons range.

"That differential closing velocity problem is the big one, and it means the way to run is going to be dependent on where the acquisition occurs relative to my speed. That also translates into the fact that the theory of crossing our lines back into friendly territory is not as easy as it sounds; so we must have some alternate contingencies.

"The premise we work with is that the Cobras are trying to protect the transport helicopters as well as themselves. Our ratio of transports to Cobras is about 5 to 1, so it would be ludicrous for us to say that every transport is going to have Cobras as escort. Thus, we have to teach defensive evasive maneuvers to our transport pilots as well. At the same time, and this is my opinion, we need to look at some type of defensive armament for our transports because there're going to be many times they are not going to have Cobras around them. And even if they do, the Cobra is by no means the perfect match for the Russian Hind. So we need some type of superior combination of tactics,



OPPOSITE PAGE: OV-10D aircraft in formation over the Arizona desert; TOP ABOVE: AH-1T firing a TOW missile; LEFT ABOVE: CH-53; CENTER ABOVE: AV-8 Harrier; RIGHT ABOVE: UH-1N

weaponry and aircraft maneuvers. That is how it needs to be and should be. What we are teaching, however, is how to fight if we had to go to war tomorrow. We can't readily alter the weapon situation, but we can help ensure that every Marine aircrewmember knows the kind of tactics and maneuvers that will increase his chances of surviving.

"In the 7-week WTI course, EVM occupies roughly 1/6 of the flight phase. A student is exposed to at least six sorties, allowing him to build on his learning experiences when engaging both helicopters and fixed wing. We start out 1 vs. 1 against fixed wing (jets) to see the fixed wing attack characteristics and types of attacks. The same thing with the helicopter follows; and all of this is demonstrated in flights. The syllabus is essentially identical for the attack and the transport helicopters, except that the Cobras put more emphasis on offensive and the transports on defensive postures.

"We teach maneuvers in the 1 vs. 1 segment and then how to implement those in 2 vs. 2.

"Those evasive maneuvers have one primary purpose—to buy time until help arrives. To buy this time we have to try and position our helicopters relative to any threat aircraft so they cannot bring their weapons to bear on us.

"I want to back up and say that the whole thing is predicated on not engaging. We will not engage unless absolutely forced to do so because we start out in a deficient status, and helicopter vs. helicopter engagements are so lethal! Studies have shown that helicopter pilots and crews who are not trained in evasive tactics will probably be killed 100 percent of the time if they are engaged by armed enemy helicopters.

"Tactically, we teach avoidance first of all and then how to force the

ABOVE: CH-53D pre-positioning prior to troop assault; RIGHT: CH-46 near Picacho Peak, AZ

threat aircraft into some type of predictability. For instance, we have just finished a period here with jets. At the beginning, there was total disdain for the helicopter—not on the part of the jet pilots, but tactically. Those tactics said, if you see a helicopter, go for it—but it was soon revealed that the jets stood a good chance of getting shot in the face if they had a head-on meeting with a helicopter. As the trials went on, we found the jet attacks were initiated more from the aft and were intentionally avoided in the forward hemisphere. That kind of predictability in tactics is what we want, since such foreknowledge will give us more time to disengage or will make us more effective as we turn to defend.

"In order to defend, or to attack if forced to do so, the helicopter must have armament equal to the task. One of those would be the Sidewinder (AIM-9L); and we are in the process of putting those short-range, infrared, air-to-air missiles on the Cobra as a test. That is my job. I have been doing some of the firing and have been developing tactics for the missile's use. We've 'killed' jets and helicopters with it. Having that missile will give us a great improvement, but it is not a panacea. We will still try to avoid the encounter; but if one occurs, we have a better chance to survive or defend ourselves. Another thing, if we can just instill respect for our weapon system on the part of the enemy, we have gained an advantage. He will know that we are not an easy target every time he engages us.

"Of course, there is no way to measure preparation for survivability. There's no way to tell, unless we actually strap on the guns and go to war. Knowing all the avoidance tactics and evasive maneuvers, having the Sidewinder or any other weapon—these are no guarantees. It is just that we know if you don't do something you are going to be killed in an air-to-air engagement; and we want to be certain that every Marine knows what to do and how to do it in the most professional manner possible."

EVM AGAINST JETS

Do the evasive maneuvers taught in the WTI course accomplish their purpose? Yes, according to Major George G. Goodwin, an AV-8 Harrier pilot who often serves as an aggressor against the helicopters during the training sorties.

He said: "Previous aviation training did not provide the skills needed to do the maneuvering that a helicopter has to do if it is going to survive in combat. Those skills are taught in the WTI course. There is a great difference between the pilots' ability to maneuver on the first sortie and that displayed on the last one."

Major Goodwin has definite opinions about helicopters vs. jets:

"The best way to get a helicopter is from an unobserved quadrant. So if I see a helicopter coming, I

may have to take some evasive action and break my tracking run; then I have to set up again. I'll run out about 8 to 10 miles, turn around and come back in. That takes about a minute out and a minute back. I know the helicopters move somewhere between 120 to 150 miles per hour, roughly 2 to 2.3 miles per minute. If I'm gone 2 minutes, the most the helicopter can move is about 5 miles; so I know what area I have to search to find him.

"Once our Marine helicopter pilots are trained, they become more and more difficult to track. In fact, a helicopter is a difficult target for us to hit if the helo pilot knows he is being attacked. Because of his aircraft's rapid turn performance, he can quite easily defeat a gunrun."

Major Jim Wojtasek, an F-4 pilot and head of the MAWTS-1 Fixed Wing Branch, also respects the rotary wing aircraft as an adversary:

"Fighting a helicopter, at least in an F-4, is no fun; it is very difficult if the helicopter pilot is maneuvering. However, if he is not maneuvering, then he becomes easy; or if he doesn't see you, he becomes a sitting duck. Evasive maneuvers are essential, and they're fine up to a point; then there has to be something for the helicopter to fight back with."

With relation to helicopter armament, Major Goodwin observed: "My personal belief is that they need to be able to fight. The problem is that the first reaction has to be to run, and currently their best course of action is to hide. I don't see a helicopter being able to duke it out with a fixed wing—not intentionally.

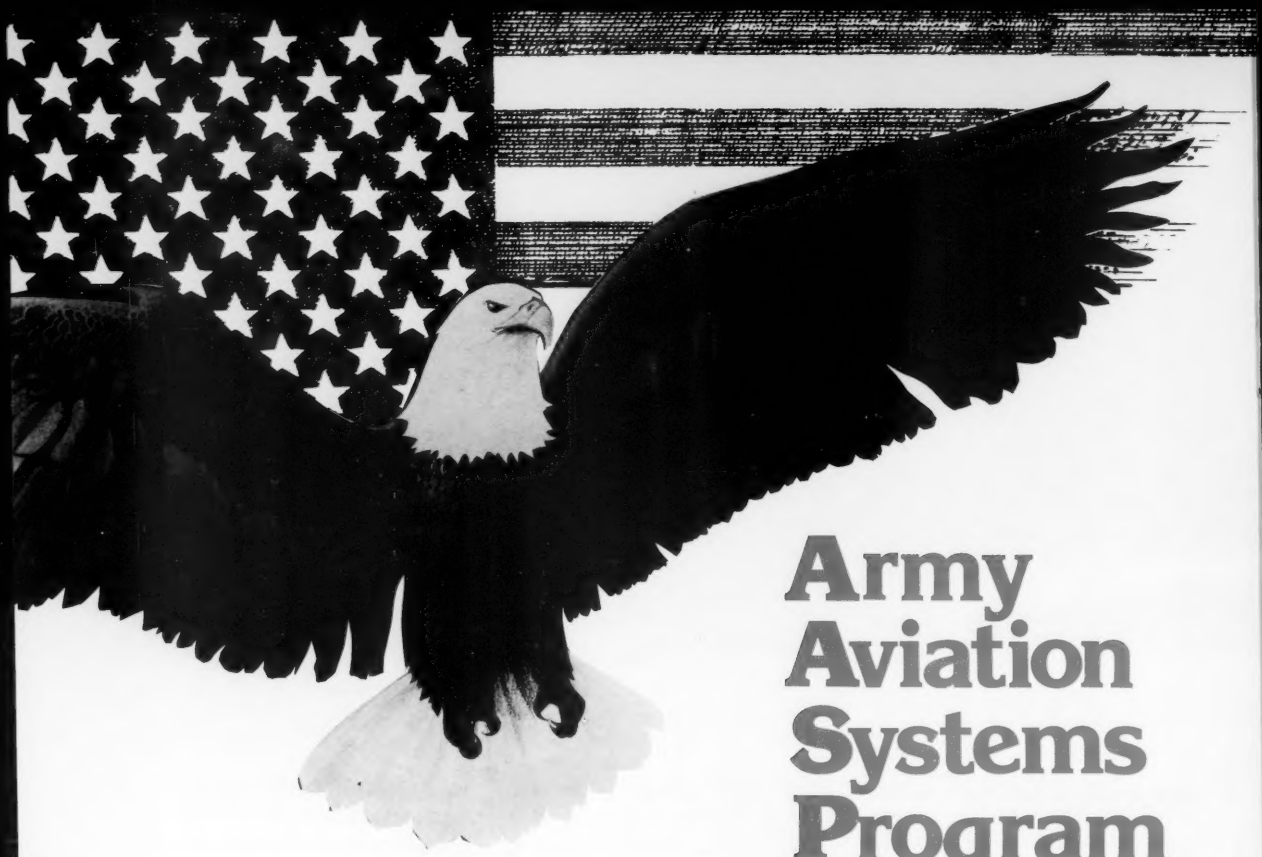
"When you give somebody a fighter capability, you have to be careful that he doesn't then think he is a fighter and go looking for trouble. That is one of the main concerns in the Marine Corps about arming all of our helicopters—that they won't forget their first and best recourse is to run and hide. And helicopters can hide pretty well. Finding them is difficult, even here in the desert terrain."

PURPOSE OF EVASION

Colonel Butcher does not refute his staff members' opinions on helicopter armament, but he explains the MAWTS-1 course emphasis on evasive maneuvers very realistically:

"What we are teaching are defensive tactics only. We have no helicopter that is armed with missiles right now which would allow us to take an offensive role. If you don't have a weapon that will allow you to shoot down a Hind with any degree of success, why train to that end? So we feel what we should do is avoid him if we can; if we can't, then we must know evasive maneuver tactics that will keep him from shooting us down."

Colonel Butcher added that the sole mission of all Marine Corps aviation assets is to support the Marine on the ground. It follows that a basic tenet on which that mission's accomplishment rests is that the Marine in the air must stay alive—even if he does have to run and hide!



Army Aviation Systems Program Review '82

Lieutenant General
Jack V. Mackmull
Commanding General
XVIII ABN Corps and Ft. Bragg
Fort Bragg, NC

Panel Chairman

Captain (P) Josef Reinsprecht
Chief of Program AASPR-82
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Fort Rucker, AL

The scope of the Concepts, Doctrine and Tactics Panel members' effort was to conduct their examination within the context of Army Aviation's role as a member of the *combined arms team* in the AirLand Battle. Furthermore, they focused their analysis on the findings of the Army Aviation Mission Area Analysis (AAMAA) and tempered the deficiencies referred to them by the AAMAA with their own experience and expertise. The objective of their analysis was to provide the Army's senior leadership with recommendations to resolve those deficiencies.

THE PURPOSE OF this panel was to look at the concepts, doctrine and tactics of Army Aviation and report its findings to the Vice Chief of Staff of the Army during the course of the review on 24 to 25 March 1982 at Ft. Rucker, AL.

Its expertise and broad frame of reference is evidenced in figure 1. The panel was composed of representatives from Forces Command (FORSCOM), Training and Doctrine Command (TRADOC) and the U.S. Air Force Tactical Air Command (TAC). Worthy of note is the fact that close combat light, close combat heavy, logistics, Air Force and total force were well represented.

Before getting into the concepts of aviation-peculiar doctrine and tactics, it was the consensus of the panel to first establish and define, in a broad sense, the concept of Army Aviation. Specifically, what is Army Aviation? How does it relate to the total Army? As aviation, and indeed the entire Army, continues to make advances in capabilities, its mission, like those of the other branches, is becoming more precise and definable. Force contribution analysis of Army Aviation indicates in a positive way that Army aircraft performing as part of the combined arms team add a third dimension to the battlefield and reinforce the effectiveness of the ground gaining arms. Put another way, Army Aviation forces can:

- maneuver
- strike
- link-up
- recycle

all with decisive violence and necessary agility.

The commissioned officers necessary to give us this capability are managed as specialty code (SC) 15, Aviation. But, they fundamentally receive their career training with one of six carrier branches (figure 2). Significantly, Field Artillery and Air Defense Artillery are receiving the very minimum allocation of aviators for carrier branch training. While this may not impair the Artillery or Air Defense, it impacts unfavorably on Army Aviation. Aviation units certainly need an appreciation of and expertise in these skills. The carrier branch concept is a compromise solution between the old concept of branch qualified aviators and an aviation branch. Military Personnel Center indicates that aviators will not normally ever serve in their carrier branch except for school attendance.

But in answering the question "what is Army Aviation, and how does it relate to the total force?" let's look at the close combat branch content by commissioned officer specialty code of active Army divisional units in figure 3.

The programed accessions for fiscal year 1982, the total inventory of commissioned officers by specialty code, and how many of *each* of the combat arms specialty codes are in table of organization and equipment (TOE) positions (and thus in units capable of performing close combat) are displayed.

Looking at the remaining TDA (table of distribution and allowance) and TOE numbers, one can see that commissioned officer Army aviators, in relation to the total combined

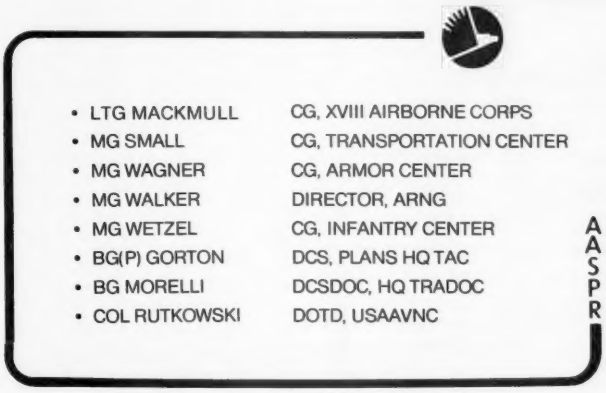
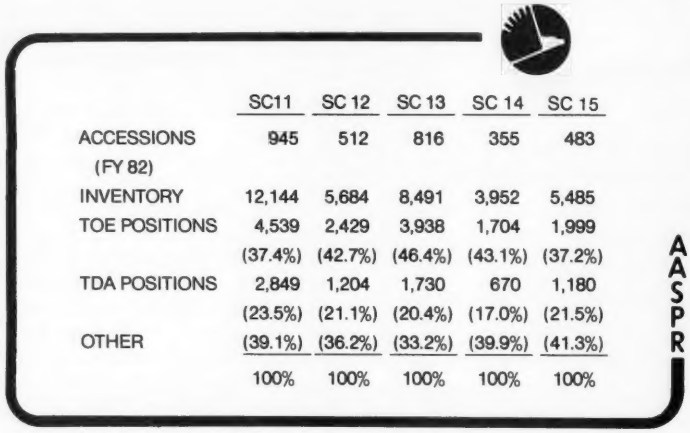

• LTG MACKMULL CG, XVIII AIRBORNE CORPS
• MG SMALL CG, TRANSPORTATION CENTER
• MG WAGNER CG, ARMOR CENTER
• MG WALKER DIRECTOR, ARNG
• MG WETZEL CG, INFANTRY CENTER
• BG(P) GORTON DCS, PLANS HQ TAC
• BG MORELLI DCSDOC, HQ TRADOC
• COL RUTKOWSKI DOTD, USAAVNC
AASPR

FIGURE 1: Concepts, Doctrine and Tactics Panel

FIGURE 2: Specialty Code 15—Commissioned Officers

arms team, are significant players. With the utilization rate of SC 15 being the same, and given that SC 15 commissioned officers are much more expensive to train, we need to maximize our investment in terms of combat power. This is the tone in which the Concepts, Doctrine and Tactics Panel was conducted.

With that as a prelude we can turn to the issues considered by this panel. The Army Aviation Mission Area Analysis (AAMAA) referred only one major issue concerning concepts, doctrine and tactics to the panel; however, that issue was, in fact, 27 subissues which were grouped under one major deficiency and it was **"that Army Aviation concepts of employment, doctrine and tactics are not adequately written into appropriate manuals to show aviation's contribution to the AirLand Battle."** With regard to the 77 major AAMAA deficiencies, this umbrella issue was ranked fifth in overall priority. The 27 subissues ranged from concepts of helicopter air-to-air combat to airspace management and joint service or multinational operations. Of course, considering the ongoing revision of many of our principal doctrinal publications such as FM 100-5, it is obvious that we are making progress. The issue of "adequacy" is one of how much progress, is it timely and are there blindspots in our concepts, doctrine and tactics? Keeping that in mind, the panel further refined the 27 AAMAA issues into what it felt were the most pressing issues as listed in figure 4.



	SC11	SC 12	SC 13	SC 14	SC 15
ACCESSIONS (FY 82)	945	512	816	355	483
INVENTORY	12,144	5,684	8,491	3,952	5,485
TOE POSITIONS	4,539	2,429	3,938	1,704	1,999
	(37.4%)	(42.7%)	(46.4%)	(43.1%)	(37.2%)
TDA POSITIONS	2,849	1,204	1,730	670	1,180
	(23.5%)	(21.1%)	(20.4%)	(17.0%)	(21.5%)
OTHER	(39.1%)	(36.2%)	(33.2%)	(39.9%)	(41.3%)
	100%	100%	100%	100%	100%

AASPR

FIGURE 3: Close Combat Potential, Combat Arms Commissioned Officer Data (SSC-NCR as of 1 Mar 81)

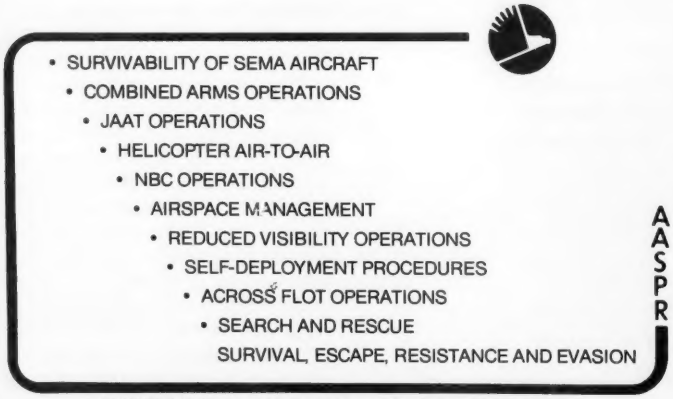


FIGURE 4: Concepts, Doctrine and Tactics Panel Issues

First, survivability of special electronic mission aircraft (SEMA) has always plagued aviation to some degree, but has become more acute in the last 3 or 4 years as we rapidly progress through the concepts of the central battle with the ensuing requirement for division and corps commanders to have a dedicated capability to see and then strike deep. The emphasis on fighting the second echelon reinforces this need. The panel felt that the opportunity to solve this issue lies in actively integrating concepts, doctrine and materiel for an adequate air defense protection suite and tactics for SEMA. The Intelligence School, in conjunction with the Aviation Center, should produce a discrete training manual on doctrine, tactics and employment of SEMA aircraft operating in the environment of the integrated AirLand Battlefield, in NATO (North Atlantic Treaty Organization) as well as Mideast scenarios, and, once completed, that manual should be classified because of SEMA's importance to the AirLand Battle.

The issue of combined arms operations in the main battle area involves the doctrine and tactics of integrating the separate factions of Army Aviation into a smoothly functioning team, and then integrating these into the scheme of maneuver of the combined arms team. Problems here have arisen because there is no

manual as yet for our new units. Additionally, these units have not been tested, and many field commanders are not fully aware nor convinced of the tactical advantages and methods of employment of aviation's new brigade organizations. A doctrinal void also exists in aviation literature describing how to integrate cavalry, attack, utility and transport aviation units, operating together as a team, to accomplish missions requiring multiproponent units or aircraft. The requirement for multiproponent publications adds complexity to an already complex aviation doctrinal system.

Opportunities to correct this are *to reinforce the role of the Aviation Center as the integrating center for aviation doctrine.* Furthermore, a how-to-fight manual should be written by and at the Combined Arms Center (CAC), in direct coordination with the Army Aviation community, that details Army Aviation doctrine and tactics in combined arms operations. This manual should tell aviators and their ground-gaining counterparts how to employ Army Aviation. Based on the status quo, one would think it sufficient just to include Army Aviation tactics and doctrine in existing how-to-fight manuals.

The third issue addressed by the Concepts, Doctrine and Tactics Panel was that of Joint Air Attack Team (JAAT) operations. While close air support and combined arms operation are not recent innovations, the deliberate, concurrent combination of attack helicopters, close air support aircraft and fire support, as opposed to a sequencing of those elements, is a fairly recent development. Several associated "how-to-fight" manuals, FMs 71-1, 71-2, 90-4 and 100-5, stress Army attack aircraft and close air support utilization but do not mention Joint Air Attack Team operations. JAAT doctrine was first published in a joint TAC/TRADOC training text, and its tactics are presently widely practiced. However, the newness of the concept and the multiple proponency concept have contributed to undue variation in JAAT procedures, tactics and techniques in academic and field training.

To resolve this, the coordinating draft of the proposed TAC/TRADOC joint field manual on JAAT, after revision, should be published as a Department of the Army and Department of the Air Force manual so that it will be applicable worldwide. Additionally, the Aviation Center, as the integrator, should be charged in close coordination with the Air Force and the combined arms to further streamline JAAT procedures, standardize communications procedures and jam-resistant compatible radios, centralize coordination under the air battle captain operating in conjunction with the ground maneuver commander and, finally, add emphasis to strengthen participation by the Field Artillery, particularly in battlefield illumination, so that JAAT operations can be effectively conducted at night.

Next the panel addressed helicopter air-to-air combat operations; specifically, Army Aviation concepts of employment, doctrine and tactics are not written into appropriate manuals for air defense by aviation elements, either while airborne or during ground operations such as refueling and rearming and laager operations.

Manuals that briefly address helicopter air-to-air combat are FMs 17-50 and 1-101. However, on this subject, these manuals are not compatible with AirLand Battle doctrine in that they address helicopter air-to-air combat only in terms of individual aircraft self-protection and neglect aviation unit operations, both offensive and defensive. Referring back to the threat, indications are that the threat has an air-to-air capability, more so than do we. The panel felt that there is definitely a requirement for a helicopter air-to-air capability to allow Army Aviation to accomplish its assigned missions as part of the combined arms team. If for no other reason than to force the threat forces to change their tactics, an air-to-air capability for Army Aviation should be vigorously pursued. Considering this problem, it would appear obvious that the Aviation Center should be assigned responsibility as the proponent for helicopter air-to-air combat concepts, doctrine and tactics, that the air-to-air concept statement presently being staffed should be approved for development into doctrine, and that Aviation Center training should be expanded to include air-to-air combat. Air-to-air combat is a reality. Army Aviation must be prepared to counter and exploit this aspect of the AirLand Battle. Threat helicopter pilots *are being trained* and threat helicopters *are being equipped* for air-to-air combat.

The next AAMAA deficiency put before the panel was that of nuclear, biological, chemical (NBC) operations and mission-oriented protective posture. Simply put, doctrine, tactics and techniques for aviation unit operations in an NBC environment do not exist. Concepts do exist and they are important forerunners to doctrine, but there is not adequate doctrine. The doctrine we do have is oriented to the individual and does not address unit tactics in a contaminated environment, especially with regard to offensive operations. There are three generic areas in which aviation unit doctrine, tactics and techniques need to be improved: contamination avoidance, individual and collective pro-

tection, and decontamination. Once this is accomplished, unit training in earnest could begin. Of the opportunities available for solution, the most obvious calls for the Aviation Center, acting as the integrating center and in coordination with the Chemical School and other combat arms, to produce the necessary doctrine, tactics and techniques for Army Aviation NBC operations.

The sixth issue addressed by this panel was the deficiency relative to airspace management and Army airspace control doctrine. Current Army efforts at airspace management are wrought with problems and frustration. Although the aviation community has diligently worked this problem, it still exists. Airspace above a combat zone belongs to the joint force commander, and this overall responsibility for management, control and defense of this airspace normally rests with the Air Force component commander. This position, however, does not reduce the Army's requirement to habitually employ aviation, air defense and artillery into this airspace, nor does it diminish our responsibility for the coordination and integration of the use of airspace. We must have this capability if we intend to maximize individual and collective combat effectiveness and preclude mutual interference.

The subissues listed here must be resolved in both Army and joint service doctrine to facilitate the tactical ground commander's ability to prosecute the AirLand Battle. Based on the magnitude and complexity of this issue, it seems that the Combined Arms Center should, as the combat arms integrator and proponent for command and control and joint airspace management, assume responsibility for and take the lead in solving the airspace control and airspace management issue.

The next issue was "reduced visibility operations." Our AirLand Battle concept states that we will conduct combat operations around the clock. While doctrinal publications are a little thin on aviation unit operations in these conditions, we are extensively developing aviation materiel to fly and shoot at night. It won't do us any good if we don't know how to employ it! Again, it seems that the Aviation Center, as proponent for instrument flight, should develop and integrate aviation concepts, doctrine and tactics for combat operations in reduced visibility conditions, to include nonaviation-specific manuals such as FM 100-5. Currently in the field, there is considerable confusion as to what kind of instrument qualifications, rules and equipment will be required in combat—Federal Aviation Administration rules, tactical instrument rules or international civil aviation organization rules. Low visibility operations must address instrument meteorological conditions, night and battlefield obscurants.

The eighth issue considered by the panel was strategic, intertheater/intratheater self-deployment procedures, a concept presently in being and with hardware development in progress.

Based on recent international developments, one can only perceive self-deployment of selected Army aircraft as being vital to ensuring that Army Aviation can first get into the battle and then strike deep when called for. Therefore, appropriate doctrine, tactics and techniques should be developed by the Aviation Center and incorporated into appropriate manuals. This issue was also addressed by the 1978 Aviation Program Review and since then we have made tremendous progress. We have conducted Operation Northern Leap to prove the feasibility of self-deployability; and, we are making rapid progress with the external stores capabilities for our new aircraft. But we need to continue; self-deployability will add flexibility to our current short-legged fleet by giving the commander an ability to mission configure his aircraft by trading fuel and payload.

The next issue considered by the panel was that of cross forward line of own troops (FLOT) operations. This issue directly involves all the other issues we have already discussed—SEMA aircraft and seeing deep, combined arms and JAAT operations attacking deep, air-to-air combat operations to get across the FLOT to attack deep, NBC operations, airspace management, reduced visibility operations, and intratheater self-deployment operations. Vulnerability continues to be the biggest problem, although in many ways Army aircraft are less vulnerable today than they were in Vietnam. This can be attributed to better air defense protection and less vulnerable aircraft, but tactics need further development.

The inherent ability of aviation forces to perform the types of missions we envisage is not succintly defined in existing how-to-fight manuals; and while the AirLand concept calls for the use of aviation forces to extend the range of the ground commander, the following questions are unanswered doctrinally:

- Just how deep can we reasonably employ aviation?
- Which aircraft will go?
- Will the forward arming and refueling points operate beyond the FLOT?

The answers to these and many other salient questions can be best provided by the Aviation Center acting as an integrator. In direct coordination with the entire aviation community and in close concert with CAC, the Aviation Center team can

produce a discrete "how-to-fight" manual on the conduct of aviation across FLOT operations which should be, when completed, classified to at least the CONFIDENTIAL level.

This leads us to the tenth and final issue: search and rescue operations and escape and evasion. If we are going to do all these things with aviation, especially in the offense, that we say that we are going to do, then we must expect to have aircrews go down in contested, and denied as well as uncontested areas, and we must offer those aircrews a reasonable hope of recovery; we don't do that now. This problem goes well beyond ongoing personnel locator system materiel developments. Army search and rescue and survival, escape, resistance and evasion procedures must be compatible with those of other services and national civil agencies. The panel feels strongly that our progress, or the lack of it, in developing an organic ability to recover aircrews impacts on our ability to effectively commit our aviation forces during self-deployment, at the FLOT and across it.

That concludes the second article in this series; but we would like to close with several questions which are prompted by looking at the variety of issues in the concepts, doctrine and tactics area: "Is the overall concept of Army Aviation, that is, how our aviation relates to the rest of the Army, is it what it should be? Could we fight, organize, equip, train and manage it better under a realignment of responsibilities? We have already compromised on the aviator issue, we no longer adhere to the principle of branch qualified aviators, why not an aviation branch? Why not an Aviation School with the same responsibilities and authorities as the other TRADOC schools? How can aviation be declared a full member of the combined arms team when, in fact, it is not organized, trained, managed and recognized as a full member?"

Based on these questions put before the AASPR-82, the TRADOC directive that outlines proponent responsibilities for aviation systems (the 21 August 1978 letter entitled "Aviation Proponency and Integration Functions") is undergoing review.

Throughout the deliberations of this panel, because of the desire for consensus, it was obvious that the principal area of conceptual controversy was not directly addressed; however, it was pervasive and present in all panel discussions; we are referring to the concept of aviation proponency. Since many members of this panel are also aviation proponents who, by the way, were all against changing the proponency concept, it was not directly discussed; however, that issue was addressed by the Training Panel and will be discussed in the September issue.

NOTE: Our sincere appreciation to COL Joseph Rutkowski, DOTD, USAAVNC; LTC George Coutoumanos (Retired); CPT(P) Paul Hinote, DOTD, USAAVNC; and, of course, the panel members for their contributions.

CONNECTION ACTAAT

Aviation Center Training Analysis and Assistance Team

DRILL DISTANCE

ISSUE: AR 95-1 states that the distance from the unit is the determining factor for setting the synthetic flight training system (SFTS) training requirement. In many cases it is difficult for Reserve Component aviators to meet these requirements since the aviator is not colocated with the unit and must travel in some cases 150 to 175 miles to the unit. It would be better to set the SFTS requirement from the aviator's current residence to nearest available training facility rather than unit location.

COMMENT: Coordination with the National Guard Bureau (NGB) was made. The NGB recommends the unit request individual approval for training for those aviators who are located nearer an SFTS training facility other than that specified by FORSCOM Regulation 350-3. The amount of training time will remain the same and will be determined as it is currently. (Directorate of Evaluation and Standardization)

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Benny Duhaime photo by Tom Greene

PEARL Articles

The purpose of each PEARL article is to keep the Army Aviation community informed of changes or new developments in the areas of aviation life support equipment (ALSE), survival techniques, rescue procedures and training, and to make suggestions, answer questions or clarify policy pertaining to those areas, and to help correct problems or irregularities in the field. Everything we say or do is said or done only with the best interests of Army aircrew personnel in mind. Should we become aware of someone doing something that they shouldn't be doing, or using equipment that they shouldn't be using, or violating regulations they should be adhering to, then it is our obligation and responsibility to bring that situation to light for the benefit of the Army Aviation community. This we will continue to do. By the same token, we would appreciate a "team" effort to put forth the best information available so we can all profit by it. We also use PEARL to pass along information which is certainly a benefit to you in this fast growing area. Tell us what you're doing out there for the benefit of ALSE and Army Aviation. Thanks for your continued support and inquiries.

Headbands for Spectacles

Headbands for spectacles of individuals working in and around Army aircraft are listed under national stock number (NSN) 8465-01-102-9129. These headbands may be ordered from SARGENT SOWELL INC., 11185 108th Street, Grand Prairie, TX 75050. Part number is 61W185, manufacturing code is 22027, the cost is $1.00 each. We do not plan to stock them because of the minimal cost.

AR 95-XXXX

AR 95-XXXX is currently being staffed/coordinated throughout the Army Aviation community. This regulation when finally published will establish/identify the Army Aviation life support system program. Should you have any comments pertaining to this draft regulation we would appreciate getting the information through your major command to DCSLOG-AV, HQDA, Washington, DC 20310; and should you have any questions on this regulation please do not hesitate to give us a call. Point of contact is the DARCOM Project Officer, AUTOVON 693-3307/2492.

AN/PRC-90 Survival Radio

There isn't a day that goes by that we do not get inquiries on the AN/PRC-90 survival radio. Seems that the biggest problem we are faced with is the replacement of the radio that is turned in for repair to Sacramento Army Depot. Because these radios are "Free Issue" it appears that units may be requisitioning the replacement radios as "Initial Issue." We have discussed this problem with the item manager (Jim Lewis), AUTOVON 992-3919, and believe that the turnaround process could be speeded up by the units if they would indicate on their requisition form that it is an "EXCEPTION REQUISITION" for a serviceable radio citing the turn-in document number of the unserviceable radio plus a 26 in column code 55 and 56. This action should preclude activities' requisition with

a low Department of Army Management Priority List (DAMPL) from being placed on backorder. NOTE: It has also come to our attention that some units are turning AN/PRC-90 survival radios in to Defense Property Disposal Services. This problem was surfaced recently during a review of property disposal assets wherein 60 of the AN/PRC-90 survival radios had been turned in. All defective/unserviceable AN/PRC-90 survival radios should be turned in to Sacramento Army Depot because of their criticality and short supply.

Survival Radio Test Equipment

We in the Army have been using the AN/PRM-32 and AN/PRM-32A test sets and the U.S. Air Force has been using the AN/PRM-95A tester to test survival radios and their personnel locator beacons. We also use the 2530/UR and 2530A test sets to test survival radio batteries. Unfortunately, these testers do not test the survival radios as a system and it is possible that a survival radio may not be fully operational when it is issued to aircrew personnel. A recent F-4 aircraft accident highlights this possibility wherein the pilot and navigator ejected from the aircraft. One individual was rescued when he used his survival radio and transmitted a beacon signal, the other individual was rescued a week later by a visual sighting. Inspection of the survival radios revealed that they both tested operational, but when they were put into the new U.S. Air Force survival avionics tester TS-24B, only the survival radio of the individual who transmitted a beacon signal was operational. This new tester tests survival radios *as a system* whereas the old testers test as a go/no-go but the antenna may not be putting out a signal. The new tester will test all survival radios and personnel locator beacons *as a system.* An accessories kit containing associated hardware and cables for accommodating all survival radios and personnel locator beacons for input and output electrical parameters *as a system* is provided. We are currently taking action to gain support for this tester (see figure) and will keep you aware of its status.

TS-24B survival radio tester

Report Of Discrepancy (ROD)

The ROD is submitted on Standard Form 364 in accordance with AR 735-11-2. Transmittal letters and indorsements are not authorized. The design of the SF 364 is sufficient to report discrepant conditions and direct disposition instructions. So, if someone finds they are getting equipment which is not up to standard, i.e., something is missing or found to be lacking, fire up an SF 364. We would appreciate an information copy be sent to this office (DRCPO-ALSE); point of contact is Mr. Tommy Vaughn. We will monitor the action and give you full support to resolve the issue early.

Aircrew Personnel Body Armor, Small Arms Protective

Assets of the assembled item, front and back plate w/carrier, in size regular, NSN: 8470-00-935-3193, have been exhausted; only minimal assets are available in size short, NSN: 8470-00-935-3192. No additional procurement will be made. Army activities authorized body armor should requisition out-of-stock sizes by available components and assemble the items locally.

Size	Vest	Front Plate	Back Plate
Short	8470-00-999-1473	8470-00-935-3177	8470-00-935-3174
Regular	8470-00-999-1474	8470-00-935-3178	8470-00-935-3175

Survival Vest, Radio Pocket

Stocks of radio pocket, NSN 8415-00-442-3616, are exhausted. The effective date of supply for the pocket which is used to accommodate the AN/PRC-90 survival radio was July 1982.

Survival Vest, SRU-21/P

The survival kit, NSN 8415-00-177-4819, has among its components a tropical personnel aid kit, NSN 6545-00-782-6412, which contains ingredients classified as controlled substances by the Comprehensive Drug Abuse Prevention and Control Act of 1970, Public Law 95-513. Authorized Army activities, designated to receive controlled substances by The Surgeon General, may submit requisitions for the tropical air kit direct to RIC S9M: Defense Personnel Support Center, ATTN: Director of Medical Materiel, 2800 South 20th Street, Philadelphia, PA 19101. All other Army elements, including National Guard installations, must contact their base hospital or nearest medical support unit. Subject survival vest is now being shipped with the butane lighter and signal flares. This is authorized by the Department of Transportation Exemption DOT E6232 (extension) scheduled to expire 1 August 1983.

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

MONTHLY WRITING AWARD

When will we learn about mountain flying?

U.S. ARMY SAFETY CENTER

Raymond P. Johnson
Directorate for Investigation, Analysis, and Research
U.S. Army Safety Center

A RECENT REVIEW of 43 mountain flying accidents showed that in only eight of the cases the investigation board did not fault the flight crew. Six of the cases involved materiel failure/malfunction, which brings a quick conclusion that when an aircraft component fails, Army crews are capable of handling the emergency quite well. The opposite may also be true. When crew error occurs, crews sometime compound the problem by trying to recover from the bad situation they created. Sometimes they even try to hide an embarrassing situation they created.

It is generally believed that instructor pilots are a cut above other pilots. They should know more about how the aircraft operates, why it does what it does, what its limitations are, and, equally as important, what the limitations of the operator are and what errors he is most apt to commit.

IPs must keep their cool in stressful situations and use good judgment. Neither of these attributes is taught in school; they are usually acquired through experience. Therefore, our IPs should be our most talented and experienced aviators. However, IPs were on board the aircraft in 11 of the 35 mountain flying accidents involving crew errors. In all 11 accidents, the IPs were at fault.

This article was not written to criticize IPs, pilots, copilots, crew chiefs, commanders, or anyone else. It should, however, point out the fact that no one is immune and that everyone should know beforehand when approaching either aircraft or operator limits. If we always operated at sea level on a standard day with a proficient IP at the controls of a lightly loaded aircraft, we would have few occasions to test those limits. If, however, we must operate in rough terrain and/or high altitudes with heavy loads, then we had better become intimately knowledgeable of some VIPs (Very Important Publications). The operators manual and TC 1-10, Mountain Flying Sense, are two prime ones.

Let's look at some of the cases to see if we have progressed over the years.

A long time ago

A U-8 pilot and passenger were cruising at 17,000 feet msl, VFR on top, when a pilot in another aircraft asked for their location. The U-8 pilot answered, "I must be near my destination because the ADF is getting nervous. I'll drop down through this cloud deck to see where I am and will call you back." That call was never made. The aircraft and the dead pilot and passenger were found at the base of a sheer rock face near the top of a 15,000-foot mountain. This particular mountain would cause the ADF needle to swing (indicate station passage) if flight was conducted near it. This condition was known by all the aviators in the area, and it was approximately 85 miles from the nearest nondirectional beacon (NDB).

A few years later a U-1A with five people and some cargo aboard tried to cross this same mountain range during inclement weather. How inclement was it? It was so inclement that they could not file an IFR flight plan, so they filed VFR instead. The planned route was to cross the southeast quadrant of an occlusion. A cold front was moving east approaching the north/south mountain range. Their destination was west of the mountain range and forecast to be VFR at ETA.

The flight did not go well. All the passes through the mountains were filled with low clouds. The crew decided to climb on top and finally, at 15,000 feet msl, were

clear of most of the tops. No oxygen was aboard (although it was available before takeoff), and the flight was continued above 14,000 feet for more than an hour. The ADF was tuned to destination NDB and when the needle started swinging, the crew decided they were at or near their destination. Radio communication with their destination established that destination weather was VFR, so the crew decided to descend into heavy buildups ahead and below them. They encountered severe turbulence and radioed ahead for any reported thunderstorm activity. Destination observers said, "No, we did have about an hour ago but they have all moved to the east into the mountains now." At 12,500 feet msl, the plane flew into a snow-covered mountain slope and flipped on its back, 96 nautical miles east of destination and less than 20 miles from where the U-8 mentioned earlier had crashed. Several days later, the crew chief and one passenger were rescued in very poor condition. The bodies of the other three people were recovered several months later.

We are not the only ones who manage to find a cloud full of rocks on occasion. A commercial airliner "in the soup" in a squall line, at night on a VFR flight plan, flew into a 2,600-foot mountain about 600 feet below the peak. Scratch one airliner and eleven people.

Here are some of the findings:

- The crew was properly trained and qualified.
- The aircraft was properly equipped and maintained.
- There was no materiel failure or malfunction.
- Postmortem found no physiological problems.
- The crew had current and forecasted weather before takeoff.
- The flight deviated from the planned route.
- The flight was operated in instrument meteorological conditions on a VFR flight plan.
- The captain, without adequate knowledge of the terrain, directed the flight to descend to an altitude which was below terrain elevation.
- There was no evidence that the captain was concerned about his position or track over the ground.
- The accident occurred while the aircraft was flying straight and level, under cruise power. The crew was not aware of the impending impact with the terrain.

What has an airliner crash to do with Army aviation? Most of the identified faults have also been committed by Army aviators. And the Army was directly involved in this case. Two UH-1s were sent into this same gray and murky weather later in the night in an attempt to retrieve the bodies. Again, the UH-1s filed VFR and ran into low scud, rain, and rising terrain. After getting caught in a blocked canyon, they tried to make a 180-degree turn to get out. One made it. Scratch one UH-1 and three more people in the same weather and mountains on the same night.

Another UH-1 was sent to retrieve the body of a civilian who had died in a privately owned aircraft several months earlier. The UH-1 made a successful landing at about 13,000 feet msl. The crew decided to reposition the aircraft, lost control, and rolled it over. Another UH-1 successfully rescued the crew.

Not so long ago

A CH-47 with a load of troops failed to clear a 10,000-foot saddle and was destroyed during an attempted landing on a steep slope.

A few years later, another CH-47 with troops and cargo aboard, trying to cross a 10,000-foot saddle, encountered low clouds in the saddle. The pilot tried a slow downwind turn and lost control of the aircraft. It crashed and burned after bouncing off the side of the mountain and after the crew thought they had regained control during the bounce.

An AH-1G was climbing around a mountain. About 12,500 feet msl, the crew decided to take some photos of an observatory. To get into a better position for the photos, the crew decided to overfly a ridgeline. Airspeed dissipated to 10 knots, rate of climb stopped, and rpm dropped to 6,350. Then things started to deteriorate—altitude, rpm, control, etc. The crew tried to "plant" the aircraft on the mountain slope. The crew survived, but the aircraft didn't. An OH-58 picked up the two pilots, who were not seriously injured, and flew them out.

With the aircraft located and the crew en route to medical facilities, surely everything was under control. Not so. The crew of another OH-58 decided they needed to go to the crash site to pinpoint its location. In doing so, they managed to get into a situation where they tried to make a slow, right, downwind turn. Anyone familiar with the limitations of the OH-58 can tell you that slow, right, downwind turns at high power settings are not addictive. Usually they are disastrous but not habit-forming. This crew survived—the aircraft didn't.

A UH-1 with nine aboard continued flight into mountainous terrain and deteriorating weather. It hit trees and was demolished. Two people survived, and the next day they tried to walk out. One survivor had to give up after a short distance because of his injuries, but the other got to a farmhouse and called a sheriff, who initiated rescue procedures.

Later, another UH-1 on a similar mission in the same mountains had an engine failure and had to make a landing into

the trees on a slope. Maintaining control of the aircraft saved all aboard. Six had major injuries, but had the aircraft hit uncontrolled, as in the preceding case, the results would probably have been as disastrous. These two mishaps illustrate that when crews make the errors that create an emergency they don't fair well. On the other hand, if the aircraft creates the emergency, our crews usually perform very well.

A U-1A pilot was flying across a mountain range, returning to his home station. He had flown nearly 8 hours since initial takeoff and had been on continuous duty more than 12 hours. The VFR flight plan began to get out of hand since he was in and out of clouds at 5,500 feet msl. The destination forecast had been given as 900 feet scattered, 1,500 feet overcast with a chance of 600 overcast, and 2 miles in light rain and fog. The pilot elected to get below the cloud layer and proceed VFR to destination. He soon realized he wasn't going to get below the clouds and started a 180-degree climbing left turn to get back on top. The aircraft hit the side of a mountain and was destroyed. Fourteen hours later rescue crews found the pilot and his passenger injured but alive.

A T-42 pilot began a cross-country training mission, intending to overfly some mountainous terrain. An hour and a quarter later, an eyewitness at 11,170 feet msl watched the aircraft fly up a canyon and crash at 12,450 feet on a snow field below a pass. Three fatalities resulted from the crash.

A CH-47 was No. 2 in a flight of three proceeding up a mountainous valley. No. 1 got into IMC, climbed, contacted a nearby approach control, and returned to home base. No. 2 attempted to cross a ridge VFR in low clouds and struck powerlines, destroying the aircraft and killing the three people aboard.

A U-21 flew into a mountainside in a remote area after the IFR flight plan was cancelled. The postcrash fire consumed the aircraft. There were five fatalities. Cancellation of IFR clearances while still IMC was not uncommon with this remotely based flight detachment.

A UH-1 was sent to the east of home base on an instrument instructional training mission. The crew, without telling anyone of any change, proceeded northwest instead to an 11,500-foot mountain peak. During an attempt to overfly the peak at less than 50 feet agl, the IP lost control of the aircraft and had to put it down among large rocks and small trees. Another UH-1 with a qualified mountain flight crew recovered the downed crew about 2 hours later.

A UH-1 IP and crew diligently determined what power was required and available to make a takeoff from an Air Force Base at 4,000 feet msl. They then flew to a ridgetop at 8,500 feet msl and tried to hover without considering what power was now available or required. Needless to say, more power was needed than was available. The aircraft turned to the right until the IP "planted" it on the side of the ridge. There was no suitable landing area on the ridge. The aircraft was totaled but the crew and passengers were uninjured. Other less experienced aviators successfully flew UH-1s in and out of the crash site for the next several days. These pilots used the performance charts in the operators manual to determine what performance would be at the higher elevations. Later, over a beer, the IP of the mishap aircraft was asked, "When did you lose the aircraft?" His answer, "I lost it on the ground before takeoff when I failed to properly plan my flight." Amen.

An OH-58 was scheduled for a night ATM training mission. En route time, with intermediate stops, was to be 7 hours and 35 minutes. The flight began at 1912 hours. Toward the end of the mission, the crew decided to deviate from their plan and do some approaches at a tank gunnery range. The pilot started an approach to a ridgeline covered with sagebrush and pinon trees. He decided not to use the landing light and attempted a go-around at translational lift. He lost control during the go-around and finally chopped power. The aircraft crashed at 0125 hours from about 20 feet with impact forces of 20 g's. The crew sustained major injuries and the aircraft was destroyed. Unplanned, unscheduled, unskillful, unprofessional, unnecessary.

More recently

How about an IP who was not aboard?

Five UH-1 crews managed to find themselves on top with low fuel. One made an instrument approach to their departure point. Two found holes, descended below the overcast, and landed in the mountains where they were refueled and returned VFR to the departure point. Two landed on adjacent ridgelines on a logging road above the cloud deck. There was an IP in one of the aircraft. Before the refueling truck could service these aircraft, the cloud deck rose and engulfed them both. The crews met and planned their departures. The IP's recommendation was that they make instrument takeoffs (ITO) from their present location after they were refueled. He told the PIC of the other aircraft that it was a "piece of cake."

After the refueling was completed, the IP had his pilot radio a VFR flight plan for two UH-1s from the mountain top to their departure point. The No. 1 crew then made an ITO from a hover on a VFR flight plan in zero-zero conditions. They made

it on top and radioed back to No. 2 to "come on up."

The second ITO was slightly different. The PIC was flying from the left seat, from a hover, but never established a climb and crashed 300 feet below and less than one-half mile from his takeoff point. Where does it say you should make an ITO from a pinnacle, from a hover, from the left seat on a VFR flight plan? This accident will surely tell you that you shouldn't. Scratch one UH-1H and crew of three.

How about another IP who wasn't aboard?

Two W1s were scheduled to lift a recon patrol to some high ground in a UH-1H. While planning the flight the night before the mission, it appeared to them that they would be overgross. They took their problem to the unit IP who checked their computations and came up with a quick fix. "Your figures are wrong. You are computing your passengers at 240 pounds when those guys won't weigh 160 pounds soaking wet the day after Thanksgiving. Get them down around 200 pounds and you'll be all right." Sure enough, when they recomputed at 200 pounds per passenger, the "all up" weight of the aircraft was below 9,500 pounds—not much, but below. They took the load to a ridgeline. The landing was okay, but while trying to lift off, rpm bled off. The crew made a hovering right turn uphill and downwind to avoid an impact area. Control was lost and so was the aircraft. The passengers with their gear were individually weighed after the accident. They averaged 267 pounds each.

How about an IP who was aboard? The IP was not functioning as an IP on this flight. However, he was qualified as an SIP, an NVG SIP, and an IFE, and he was flying the aircraft at the time of the mishap. Approaching a ridgeline above 12,000 feet msl, he suddenly realized he had full left pedal and only 6300 rpm. The situation quickly deteriorated to a shallow right turn that got progressively worse, shuffling very badly with no pedal control and losing altitude. The aircraft hit and rolled to the left, ending up on its back. The IP said it was like a topping check. If you pull collective until the rpm bleeds off, it really is something like a topping check, isn't it?

None of the crew knew what torque was being used nor what was available. They did know that when they took off they had 40.5 pounds available at 6,000 feet. They had never computed it for 12,000 feet, nor did they look to see what it was reading in the last 10 to 15 minutes of flight. They did not know they had exceeded VNE during cruise flight before the mishap. The IP had beeped rpm to 6500 because it sometimes crept to 6625 to 6650 in flight. The lowest rpm anyone saw was 5700 and descending. The crew thought they were at 10,500 to 11,000 feet msl when in fact they were at 12,000 feet. The highest anyone remembers on the altimeter was 11,200 feet. The PIC/IP was confident he could handle any situation in a UH-1 and was not particularly concerned when he found himself with full left pedal and 6300 rpm. He expected to fly out of it. The PIC/IP had deviated from the planned route to take a closer look at this particular ridge.

A flight of four AH-1s en route to a training site approached a mountain pass. The lead pilot reported they would not be able to get through. The No. 4 pilot, the platoon leader, said they should go a little bit further. Soon afterward, lead entered IMC and lost control of the aircraft. Control was partially established before they broke out of the clouds, but there was not enough room to fully recover before the aircraft crashed. Both pilots survived. One pilot was able to walk to a road, stop a vehicle, and get help.

IMC breakup procedures had been briefed before the flight. However, no one in the flight followed them. There was a short period of intense confusion (panic). The three remaining aircraft made a 180-degree turn to return to the departure point and were immediately confronted with another flight of four AH-1s inbound to the same pass. The original three passed about 50 feet below the second flight. Neither flight had any idea the other was in the area. Somehow, everyone missed everyone else.

Not all of the mistakes made by the crews in these cases nor the solutions have been listed in this article. For those who are interested in improving their ability to operate in rough terrain and high altitude, don't read the operators manual and TC 1-10; study them! The limits of the aircraft are pretty well outlined in the operators manual, and TC 1-10 points out lessons learned in dealing with mountain operations. Compute; don't check off the 365F. Unless you really know the weight of your aircraft, how can you determine the capabilities of it? Study the weather and learn to cope with it. Who expected to operate a helicopter at a density altitude of 15,000 feet when he was learning to fly one? But if you *are* asked to perform at high altitudes over rough terrain, don't wait until you get there to find out you are asking for more than your aircraft can produce.

How do you go inadvertent IMC in the daytime? Webster defines inadvertent as unintentional, but it also defines it as heedless and negligent. Check the publications that pertain to your operations, local SOPs, etc. And be sure you correctly prepare a performance planning card before pulling pitch. Please.

Aviation Center's Branch Training Team: ACTAAT

IN THE LATE 1970s, Training and Doctrine Command (TRADOC) headquarters recognized a serious shortcoming in the Army's training system. The shortcoming was that no formal mechanism existed to provide a link between units in the field and the service schools and training centers. A process was envisioned to serve as the foundation for the development of a closed loop feedback system through which information would flow from the field to the schools, integrating centers and TRADOC headquarters. The information then would be analyzed, acted upon and returned to the field as new or improved training policies or procedures.

On 21 August 1979, General Donn Starry, then TRADOC commanding general, directed that each TRADOC institution establish a "branch training team" for the purpose of conducting visits to proponent units in the field. The objective of these visits would be to "establish and maintain a meaningful, productive dialogue between the TRADOC schools and field units, battalion size and smaller, and to collect data pertaining to the effectiveness of training at the TRADOC institutions."

The establishment of the branch training team at the U.S. Army Aviation Center, Ft. Rucker, AL, required coordination with each of the other TRADOC institutions which was the proponent agency for the various aviation related areas, i.e., Ft. Benning, GA, for utility helicopters, Ft. Knox, KY, for attack helicopters, etc. Once the coordination was accomplished, the path was clear for the formation of the Aviation Center's branch training team, known as the Aviation Center Training Analysis and Assistance Team, or ACTAAT.

ACTAAT visits provide an opportunity for field units to provide data and input into the training programs of the Aviation Center, thus increasing training effectiveness and producing a final product which readily meets the needs of the tactical mission. The ACTAAT visits further provide the field units a direct connection to other similar programs within TRADOC institutions and thus a voice in the formulation of doctrine. In the area of assistance, the team provides training support materials and briefings on USAAVNC training plans and programs. The ACTAAT further serves as a point of contact at the Aviation Center for information exchange and field feedback.

The data and comments collected during a visit are collated into a final report and purged of any unit or personal identification. The data and comments are staffed to the appropriate agencies and directorates for response. The responses on all issues developed on a visit are then submitted to the commanding general of the Aviation Center for approval. The final report is then forwarded through the commander of the Aviation Center to the commander of TRADOC for information and/or any further action. Copies of the final report are supplied to the commanders of the visited units. Information pertaining to other TRADOC institutions is sent to the proponent agency for the proper disposition.

Since its inception, the ACTAAT has conducted visits to active duty and Reserve Component Army Aviation and air traffic control units throughout the world. Time and funding, however, affect the frequency with which the visits may be conducted. The current projection is for annual visits with units in Korea and Europe with the remaining units being visited every 30 to 36 months.

Methods to provide more timely information sharing and to increase the contact between the Aviation Center and aviation related field units are constantly being developed and evaluated. The monthly feature in the *Aviation Digest*, "The ACTAAT Connection," has been established to highlight major issues from ACTAAT visits.

The first 18 months of ACTAAT visit reports have been consolidated and resubmitted to the appropriate agencies for their comments. The purpose of this consolidated report is twofold. First, it provides an opportunity for the various agencies responding to ACTAAT findings to update their responses. Second, upon completion the report will be distributed to each aviation and air traffic control battalion or separate company-sized unit throughout the Army. The consolidated report will enable the ACTAAT to reach all units on a yearly basis and will provide the very latest

information on those subjects. The consolidated report will be distributed in the early summer and will become an annual report.

Although determination of data for improvement of USAAVNC courses of instruction is paramount to the ACTAAT mission, it has been found that the rapport established with the unit because of the visit is of equal importance. The visit provides the unit an opportunity to tell USAAVNC what is needed to make aviation a full partner in the combined arms team, what type of training to emphasize, and what training products are needed to accomplish efficient unit training. In turn, this data is considered for use throughout the aviation community, saving resources and increasing training effectiveness and tactical awareness.

The ACTAAT stands ready to provide assistance or information in Army Aviation or air traffic control matters. Any questions or requests may be made by calling AUTOVON 558-4691 or 6571 or by writing the Directorate of Evaluation and Standardization, ATTN: ATZQ-ES-E, Ft. Rucker, AL 36362.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hot Line, AUTOVON 558-6487 or 205-255-6487 and leave a message

CONNECTION

ACTAAT

Aviation Center Training Analysis and Assistance Team

NVG QUALIFICATION

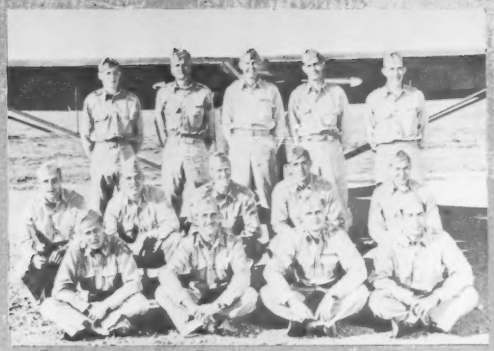
ISSUE: There is a strong feeling in the field that night vision goggles (NVG) qualification training covers more tasks than are needed. It is perceived that there is little need for traffic pattern maneuvers other than normal and shallow takeoffs and landings. It is also perceived that proficiency in simulated emergency procedures is required only for low level and hovering autorotations. Traffic pattern work is largely unrealistic because of the lack of visual feedback at altitude under NVG. Simulated emergency maneuvers, other than those cited, will be flyable and the aviator will be able to fly the aircraft to a suitable area for a normal NVG landing, or to a prepared field where NVG will not be required. Instructor pilots stated that more time should be devoted to teaching aviators the visual cues applicable to tactical NVG contour, low level, and nap-of-the-earth flight.

COMMENT: NH/NVG flight training courses are designed to develop proficiency in all the aircrew training manual (ATM) maneuvers which may be performed in the NH/NVG mode. This ensures aviator proficiency in all aircraft operations within the NH/NVG flight environment. This also applies to emergency procedures since it is impossible to anticipate the varied flight conditions an aviator will encounter while in the NH/NVG flight environment. The ATM delineates the minimum iterations necessary to achieve maneuver qualification. The commander may increase the number of iterations as necessary to attain or maintain maneuver proficiency. When fielded, the AN/PVS-6 Aviator Night Vision Imaging System (ANVIS) will provide sufficient visual cues to allow night flight at traffic pattern altitudes. Additionally, although unlikely, it is conceivable that a running landing may have to be conducted while wearing NVG at a tactical site due to constraints of fuel, time or tactical situation. Therefore, aviators should be trained to perform all required maneuvers to proficiency in case of such a contingency. As stated in an earlier comment, the NH/NVG task list is being reviewed, in an attempt to align requirements with the flight envelope of the AirLand Battle. These, and similar issues will be considered during that review. (Directorate of Training Developments)

FORTY YEARS OF ARMY AVIATION

This is the second of a five-part series by Richard K. Tierney

Post Army Airfield, Fort Sill, OK



The first pilot class. This class was graduated in September 1942 at Fort Sill, OK. Reading from left to right they are: front row, LT S. A. Williamson, CPT J. E. Swenson, LT H. R. Phillips and SGT J. S. Rengers; middle row, SGT R. S. Wilkinson, SGT W. C. Schoonover, LT J. W. Byrd, LT W. D. Stephens and SGT C. B. Allen Jr.; top row, LT B. A. Devol Jr., LT G. M. Albert, LT R. P. Stallings II, CPT J. M. Watson Jr. and LT T. L. Hendrix. Absent when this picture was taken were CPT E. S. Gordon and LT J. U. Overall (inset).

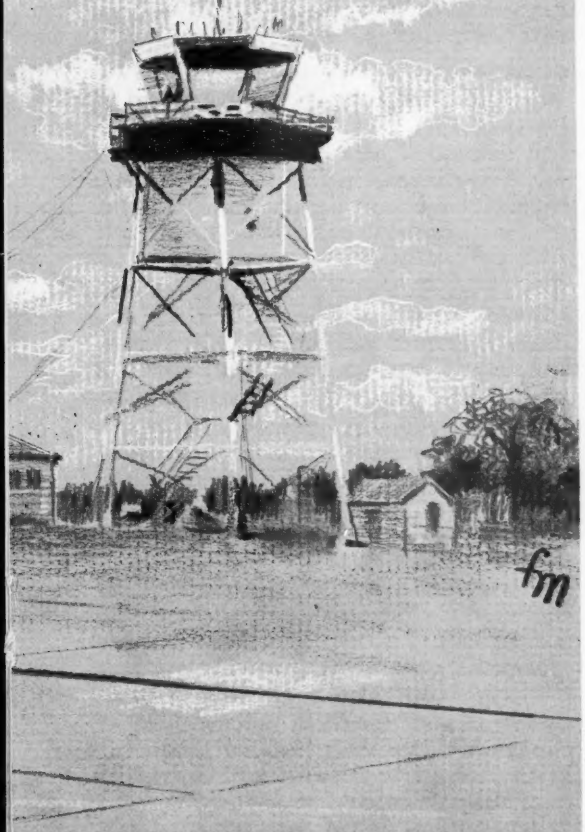


illustration by Fred Martin

Part 2: BUILDING A TRAINING PROGRAM

Department of Air Training

The Department of Air Training's first class of instruction was for mechanics. It got underway on 27 July 1942 and lasted 5 weeks—making it Army Aviation's first class. Meanwhile, preparations to begin the first flight class were completed by the end of July. The instructors, consisting mostly of members of the Class Before One, did not have long to wait. The 19 students who started out in Pilot Class One reported in on 1 August and began training two days later, flying the L-4B Piper, the L-2B Taylorcraft and the L-3C Aeronca. Sixteen of them were graduated on 18 September.

Post Field at Fort Sill was turned over to the Army Ground Forces by the Army Air Corps. Thus Army Aviation had its first airfield with 23 aircraft on hand and 100 L-4s plus 50 L-2s on order. Several small auxiliary fields were built either on the reservation or on nearby leased land. Some tactical training strips also were built.

For the first five flight classes the Department of Air Training was able to accept both officer and enlisted soldiers from the Army Ground and Army Service Forces. However, each student had to have at least 60 hours of flight time and hold (or have recently held) a pilot's license. That prompted growing pains. By November 1942, the sources for obtaining experienced pilots from within Army Ground and Service Forces had dried up. A plan under which the Army Air Forces would supply 100 basic trained pilots a month also failed. Consequently, an

Colonel William W. Ford, left, first director of the Department of Air Training chats with Lieutenant Colonel Gordan J. Wolf, first deputy director, at Fort Sill, OK, in 1942.

agreement was made with the Air Corps that effective 26 November it would provide primary flight training at Denton, TX, to Army Ground Forces' pilots. In March 1943 that training began alternating between Denton and Pittsburg, KA; and by November it was completely phased out at Denton.

Upon completion of Air Corps primary training the students were given silver wings, and then they reported to Fort Sill for tactical flight training that would make them Army aviators. They showed up at Fort Sill a little cocky, with 50-mission crushed hats, and without any respect whatsoever for Colonel Ford's desire that everyone stay off the grass. Only a few of their number experienced the wrath of the veteran from the Field Artillery before they quickly gained a little humility—and stayed off the grass!

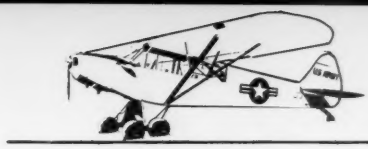
Originally the Field Artillery planned for 80 percent of its aviators to be enlisted, with the 20 percent officers providing supervision. But things didn't work out that way, primarily because people who were able to be aviators also were officer candidate school (OCS) material. The enlisted pilots usually left troop units for OCS shortly after reporting for duty. The War Department reasoned that it would be better for enlisted soldiers to attend OCS before going to flight school, and on 20 April 1943 they ceased to be eligible for liaison pilot training.

In late 1944, the Army Air Forces elected to terminate training at Pittsburg and Class Number 88 was the last to be trained there. Class Number 89 was shifted to Sheppard Field, TX.

AGF Air Training School

Army Aviation was an instant success in combat and soon branches other than Field Artillery were clamoring for light organic aviation to support their operations. In fact, it became a common practice among the combat arms to borrow the Cubs whenever possible. This situation did not go unnoticed at the War Department. As a result, in August 1945 it extended organic aviation to five more users: Cavalry, Infantry, Engineers, Armor and Tank Destroyer. The War Department also approved additional light aircraft to accommodate the expansion.

This growth of Army Aviation resulted in a need to increase the flight training program and, effective 7 December 1945, the Department of Air Training at the Field Artillery School was redesignated the Army Ground Forces Air Training School. It was organized to provide tactical training to support the combat arms that were incorporating organic aviation. Brig-



adier General Ford (promoted and back from troop duty after departing Fort Sill in January 1944) was made commander.

After World War II the Army reorganized its schools, and the Army Ground Forces Air Training School was redesignated again as the Department of Air Training. However, it continued to train Army aviators for all of the combat arms.

The Korean War brought on another increase in student input; and by 1953 Army Aviation was on the verge of having a full-fledged Army school.

Credit for the success and continued growth of Army Aviation from the 1940s to 1953 can be attributed to many people, including General Ford and Colonel Wolf, who had become the Department of Air Training commander in 1944. Other key people were Captains Robert R. Williams and T.S. Baker, each of whom served tours as chief of the Flight Division; Captain E.F. Houser, chief of the Tactics Division; also Captain Robert M. Leich and Lieutenants Marion J. "Jake" Fortner and Lloyd M. Bornstein. Lieutenant Fortner, a member of the Class Before One, was an aeronautical engineer and experienced in light aircraft maintenance. He was primarily responsible for developing maintenance courses for both pilots and mechanics.

Army Aviation School

The success and growth of Army Aviation resulted in the establishment of the Army Aviation School at Fort Sill on 1 January 1953. It was made a Class I activity under the commanding general of the Fourth Army by authority of Department of Army General Orders No. 9, dated 16 January 1953. In reality the school did not come into existence until 1 July 1953 when the Department of Air Training was deactivated. Also the birthday of the Army Aviation School was officially changed to 6 June to coincide with the birthday of Army Aviation. Secretary of the Army, Wilber M. Brucker, approved the change 23 February 1960 and ordered that the 6 June birthday be made a matter of record.

By 1953, primary fixed wing flight training was being conducted for the Army by the Air Force at Gary Air Force Base, San Marcos, TX, in L-19 (O-1) Bird Dogs and L-21 Super Cubs. Also, the Army established its own instrument flight training at Fort Sill in January 1953. The LC-126, a Cessna, was used in the instrument flying course which was under the Department of Flight at the Aviation School. In August, the first instrument flight examiner's course was initiated.

When the Korean War broke out in June 1950, Army Aviation's training assets consisted of 50 members on the staff and faculty, about 100 students and about 125 aircraft. By August 1954, the Aviation School had grown to about 300 members, 800 students and about 500 aircraft. Fort Sill could no longer accommodate the growing Army Aviation School. Also, periodic storms of great intensity took their toll on the aircraft, causing millions of dollars in damage and resulting in thousands of flight training hours lost. It was time to look for a home of its own for Army Aviation.

The Move To Rucker

After considering eight possible sites, Camp Rucker, AL, was selected primarily because it had four major advantages over the others. It included Ozark Army Airfield (now Cairns) with three 5,000-foot runways; its buildings had just been renovated at a cost of $8 million; huge truck stands would serve as good heliports for an emerging rotary wing training program; and it had large buildings that had been used for truck repair and would serve as good helicopter maintenance hangars.

Brigadier General Carl I. Hutton, who had reassumed command of the Army Aviation School at Fort Sill in July 1954, was alerted by a Department of the Army letter dated 23 July 1954 to move the Aviation School and Aviation

EXTRACTS FROM GENERAL ORDERS PERTAINING TO ARMY AVIATION

DA General Orders No. 9 dated 16 January 1953:

I. .ARMY AVIATION SCHOOL. FORT SILL. OKLAHOMA. Effective 1 January 1953, the Army Aviation School is established at Fort Sill, Oklahoma, as a class I activity under the jurisdiction of the Commanding General, Fourth Army.

DA General Orders No. 85 dated 15 December 1954:

I. .ARMY AVIATION SCHOOL. CAMP RUCKER, ALABAMA. Effective 1 November 1954 the Army Aviation School is discontinued at Fort Sill, Oklahoma, and concurrently established as a class I activity at Camp Rucker, Alabama, a class I installation under the jurisdiction of the Commanding General, Third Army.

DA General Orders No. 17 dated 2 March 1955:

II. .ARMY AVIATION CENTER. Effective 1 February 1955, the Army Aviation Center is established as a class I activity, under the jurisdiction of the Commanding General, Third Army, at Camp Rucker, Alabama a class I installation under the jurisdiction of the Commanding General, Third Army. The Army Aviation Center will consist of the Army Aviation School and such other activities as may be assigned.

DA General Orders No. 63 dated 27 October 1955:

III. .CAMP RUCKER, ALABAMA. Effective 13 October 1955, Camp Rucker, Alabama is redesignated Fort Rucker, Alabama and announced as a permanent Department of the Army installation.

DA General Orders No. 26 dated 29 June 1956

III. .TRANSPORTATION AIRCRAFT TEST AND SUPPORT ACTIVITY, FORT RUCKER, ALABAMA. Effective 1 July 1956, the Transportation Aircraft Test and Support Activity is established as a Class II activity under the jurisdiction of the Chief of Transportation, at Fort Rucker, Alabama, a class I installation under the jurisdiction of the Commanding General, Third Army, and is assigned to the Transportation Supply and Maintenance Command.

DA General Orders No. 29 dated 11 July 1956:

IV. .WOLTERS AIR FORCE BASE, TEXAS. Effective 1 July 1956, Wolters Air Force Base, Texas, is transferred from the control of the Department of the Air Force to the Department of the Army, and designated Camp Wolters, Texas, a class I installation under the jurisdiction of the Commanding General, Fourth Army.

DA General Orders No. 41 dated 12 September 1956:

I. .SIGNAL CORPS AVIATION TEST AND SUPPORT ACTIVITY, FORT RUCKER, ALABAMA. Effective 15 September 1956, the Signal Corps Aviation Test and Support Activity is established as a Class II activity under the jurisdiction of the Chief Signal Officer, at Fort Rucker, Alabama a class I installation under the jurisdiction of the Commanding General, Third Army.

DA General Orders No. 22 dated 25 April 1957:

I. .UNITED STATES ARMY AVIATION SAFETY BOARD, FORT RUCKER, ALABAMA. Effective 1 May 1957, the United States Army Aviation Safety Board is established as a class II activity under the jurisdiction of the Deputy Chief of Staff for Military Operations, at Fort Rucker, Alabama, a class I installation under the jurisdiction of the Commanding General, Third Army.

CONARC General Orders No. 14 dated 15 July 1955:

SECTION II. .ORGANIZATION OF BOARD. Pursuant to authority contained in paragraph 60 a (6), Change 7, SR 10-5-1 and under the provisions of AR 220-5, the 8576th DU, Board Number 6, Headquarters Continental Army Command, is organized . . . with station at Camp Rucker, Alabama. (Board No. 6 was redesignated U.S. Army Aviation Board by authority of CONARC General Orders No. 1 dated 1 Jan 1957). Department of the Army General Order No. 5, dated 4 Feb 1963 changed the name to U.S. Army Aviation Test Board.

ABOVE: ***An L-19 (O-1) Bird Dog***

BELOW: ***Ozark Army Airfield, Camp Rucker, AL, when the Army Aviation School moved from Fort Sill, OK.***

Last class to start at Camp Gary, April 1959

STANDING *(left to right) - Unknown, Unknown, 2LT Warren E. Griffith II, 1LT Edward A. Colburn, LTC James D. Kidder (Class Leader), 2LT James D. Bradin IV, 2LT Robert L. Burns, 2LT Terry L. Gordy, Unknown, 2LT Paul D. Vanture, 2LT James R. Hubbard, 2LT Allan R. Fetters, 1LT George F. Newton, 2LT Roy E. Lindstedt, CPT John W. Lauterbach, 2LT Stephen McIntyre.*

SITTING *(left to right) - 1LT Robert A. Herbold, Unknown, 1LT James W. Napier III, Unknown, 2LT Bestor W. Coleman III, Unknown, 2LT Charles L. Haskell Jr., 2LT James Thomas, Ms Brown (Flight Records), 1LT Richard W. Buckland, Dr. Prophet (HUMRO), 1LT John C. Lobias, 2LT William D. Gardner, 2LT Ronald C. David, Unknown, 1LT Jack D. Kincaid, 2LT James D. Bates, 2LT Henry L. Harvey Jr.*

KNEELING *(left to right) - All instructors, all unknown except fourth from left, Mr. Don Lofton.*

NOT PICTURED - *1LT John J. Berner, 1LT Alexander S. Budd Jr., 1LT William L. Effler, 1LT Ronald Kennedy, 1LT James M. Langston, 1LT Max K. McHaney, 1LT Raleigh R. Meyer Jr., 1LT Marvin E. Morris, 1LT Robert P. St. Louis, 1LT Bob T. Watson, 2LT Charles F. Densford Jr., 2LT Robert K. Dillon Jr., 2LT Holman Edmond Jr., 2LT Philip R. Fidler, 2LT James P. Mellin, 2LT Paul J. O'Donohue, 2LT Edwin P. Ofgant Jr., 2LT Ronald D. Renfro, 2LT Stephen M. Solomon IV, 2LT Leigh R. Sprouts, 2LT William Tantau, 2LT Charles Teeter, 2LT Hasten B. Walker, 2LT Langston W.T. Weinberg.*

Test Section of (Army Field Forces) Board No. 1 to Camp Rucker. The general's chief of staff, Lieutenant Colonel Carlyle W. Arey, departed Fort Sill for Camp Rucker on about 20 August with a party of 50.

On 1 September 1954 General Hutton assumed command at Camp Rucker. Colonel Jules E. Gonseth Jr., assistant commandant of the Aviation School, remained behind to phase out operations at Fort Sill.

The first course to get underway was a combined Army Aviation tactics course. Class AATC-54-K and Class AATC-54-L, both of which had completed primary flight training at Gary, became AATC-54-K-L. That class of 120 officers started training 18 October 1954 to become the first Aviation School flight class at Rucker. It was graduated 29 January.

By December 1954, there were several classes in session at Camp Rucker and all necessary facilities were operating. The Army Aviation School celebrated its first Christmas in its new home.

The development of the Army Aviation training base received a couple of shots in the arm in 1955. The Army Aviation Center was established 1 February 1954 and on 13 October Camp Rucker was redesignated Fort Rucker, making it a permanent Army installation.

A Department of Defense memorandum dated on 19 April 1956 directed the Army to assume responsibility for all of its Army Aviation training. The Army took over Camp Gary 14 December and awarded a primary flight training contract to W.J. Graham and Sons, Inc. The first class, 57-9, was made up of 115 Army students.

In a move to improve its program, the Army moved primary fixed wing training to Fort Rucker on 1 July 1959. The Department of

First Primary Fixed Wing Class at Fort Rucker

OFWAC 60-1
11 September 1959—27 January 1960
Green I on Left—Green II on Right

1st Row (L to R)
Maj R.M. Shoemaker
Capt J.F. VanSant
Maj C.B. Sinclair
Maj R.S. Kellar
Maj K.E. Davidson
Maj R.L. Gabardy
Lt Col W.C. Boehm
Lt Col M.H. Patsons
Lt Col G.S. Beatty, Jr.
Col A.M. Burdett, Jr.
Lt Col J.W. Hemingway
Lt Col G.A. Peyer
Maj M.M. Mahmud
Maj R.J. Dillard
Maj T.A. Crozier

Capt W.E. Crouch, Jr
Capt W.A. Lusk, Jr.
Capt J.M. Blair
Capt J.A. Lynch

2nd Row (L to R)
1st Lt D.J. Kim
1st Lt A.L. Powell
1st Lt C. Chin
Capt C. Chang
Capt K. Yoon
1st Lt P.L.J. Klempnow
1st Lt J.B. Morgan
1st Lt D.T. Moentmann
1st Lt W.D. Gess, Jr.
Capt J.H. Mapp

Capt W.T. Fitts, III
Capt J.B. Hatch
1st Lt H.E. Malone, Jr.
1st Lt L.E. Scoggins
2nd Lt R.L. Hazlewood
2nd Lt R.W. Nelson
2nd Lt K.O. Hulse
1st Lt C.E. Sauer
2nd Lt R.L. Chancellor

3rd Row (L to R)
1st Lt C.G. Robertson
1st Lt R.L. Filson
1st Lt J.M. Henderson, Jr.
1st Lt R.D. Millspaugh
1st Lt Z.K. Rector

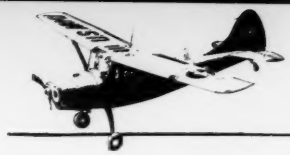
1st Lt F.W. Russell
1st Lt T.R. Chapman
1st Lt C.F. Morgan
2nd Lt R.M. Rusch
1st Lt J.A. Matos, Jr.
2nd Lt J.L. Christie
1st Lt F.D. Scott
2nd Lt D.M. Whitehead
2nd Lt D.H. Halsey
2nd Lt G.W. Nelson
2nd Lt J.P. Vaughn
2nd Lt C.F. Shearer

Absent—
Capt H.L. Wheeler
1st Lt W.F. Boyle

T-41B Mescalero

T-42 Cochise

The first five Mohawks are lined up at Bethpage, NY, in July 1960 with three YAO-1 (OV-1) models flanked by two AO-1AFs.



Primary Fixed Wing Training was established at Lowe Army Airfield. Lieutenant Colonel G.W. Jaubert was the first director.

The first class at Fort Rucker, 60-1, began training 11 September 1959 and was composed of 57 officers ranging in rank from second lieutenant to full colonel. Many of this group were destined to play key roles in the development of Army Aviation, and in fact the U.S. Army as a whole.

Fort Stewart

As the mid-1960s approached, the war in Vietnam intensified and placed heavier and heavier demands on the Army for aviators. The skies became overcrowded at Fort Rucker, and in February 1966 the Department of the Army approved the establishment of a U.S. Army Aviation School Element at Fort Stewart, GA, to train initial entry fixed wing students. The flight training program was conducted at Fort Stewart's Hunter Army Airfield. It consisted of phases A and B (primary and advanced) in the single engine T-41 Mescalero. The students then went to Rucker for 16 more weeks of training, 8 in the twin engine T-42 Cochise and the remainder in the single engine O-1 Bird Dog (the airplane the students would most likely be flying in Vietnam).

When hostilities ceased in Vietnam, the input of flight students was greatly reduced. In a move to consolidate flight training at Fort Rucker, the Department of the Army directed that the Army Aviation School Element be phased out. The last class at Fort Stewart was Aviator Qualification Course 74-2 which began training 19 July 1973 and was graduated 21 August 1973.

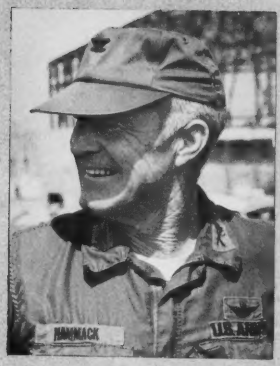
During the 1960s, the emphasis in Army Aviation was shifting from fixed wing aircraft to rotary wing. Late in that decade, the requirement for fixed wing operations decreased by about 45 percent. Thus, plans called for elimination of the initial entry fixed wing program. This by no means meant that the Army's fixed wing operations were being phased out completely. The OV-1s, U-8s, U-21s, T-41s, T-42s and C-12s would continue to play vital roles in support of the Army Aviation mission. The Army's fixed wing needs were met by transitioning rotary wing aviators into fixed wing aircraft through qualification courses. The first "Q" Course input for fixed wing aviators for fiscal year 1972 was scheduled to include 446 students.

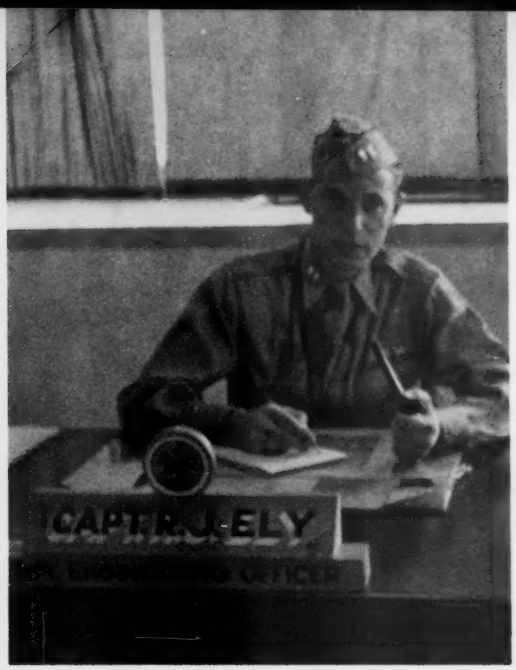
A 29-year era in Army Aviation history ended at Fort Rucker on 29 June 1971 with the combined graduation of 35 Army aviators of initial entry fixed wing classes 71-17 and 71-18. Part of the graduation ceremonies included an impressive—and highly nostalgic—flyby. It was a final salute back through the years to all of the fixed wing classes, to and including the Class Before One. In fitting tribute to this "End of an Era Flyby" Colonel J Y Hammack, then the senior Army aviator at Fort Rucker, led the pass-in-review in an L-5. Then came the 18 O-1 Bird Dogs—in formation, impressive and proudly passing the reviewing stand in front of the Aviation Center headquarters building for the last time. As they passed, one could see approaching in the distance UH-1s flown by graduates of an initial entry rotary wing class—also in formation, also proud and impressive, and also Army aviators, as were those who preceded them.

Army Rotary Wing History

The helicopter began attracting attention in Army circles in early 1945. It was felt that the flight capabilities of rotary wing aircraft made them uniquely qualified to "live" in the field and provide airmobile support to the ground forces. Subsequently, plans were made to obtain helicopters, and an informal agreement was made with the Army Air Corps to train the first Army helicopter pilots. They were to be selected on an individual basis and trained in R-4, R-5 and R-6 helicopters at Scott Field,IL; Sheppard Field, TX; and San Marcos, TX.

continued on page 32





OPPOSITE: *O-1 Bird Dogs in the "End of an Era Flyby" pass the reviewing stand on 29 June 1971 in front of the headquarters building at Fort Rucker, AL. This combined graduation of Classes 71-17 and 71-18 marked the end of Army Aviation initial entry fixed wing training.*

OPPOSITE INSET: *Colonel J Y Hammack led the pass in review in an L-5.*

LEFT: *Captain Robert J. Ely, The Army's first helicopter pilot.*

BELOW INSET: *Bell's YH-13 was the first helicopter procured by Army Aviation in 1946.*

BOTTOM: *The Continental Army Command's Board Number 6 tested the YH-13H. Some of the Army aviators who test flew the Sioux were (left to right, kneeling) CWO Alva Anderson, Captain Charles C. Watts and CWO George W. Cox; (standing) CWO Bert E. Ratcliff, CWO Walter S. Catlow and CWO Joseph H. Pfluger.*

Captain Robert J. Ely completed the course at Scott Field in 1945 to become the Army's first helicopter pilot. Others who received their training from the Air Corps included Captains Kenworthy Doak, Thomas J. Rankin, and J Y Hammack, and Lieutenants Robert R. Yeats, Daniel Wilson and Norman Goodwin.

The first helicopters were procured for Army Aviation in 1946 with the purchase of 13 Bell YR-13s (in 1948 the letter designation was changed from R to H). The next year Bell conducted the first formal Army helicopter pilot training course, using the YR-13. Those attending were Lieutenant Colonel Jack Marinelli, Major Jack Blohm, and Captains Hubert D. Gaddis and Darwin P. Gerard.

Interest mounted in the helicopter and in 1947 the Army contracted with the Air Corps to provide primary rotary wing training for Army students at San Marcos. The first class got underway on 1 September 1947 and lasted 6 weeks. Major Harry Bush, Captains Jack Tinnen and Troy B. Hammonds and Lieutenant L.C. Boyd were trained in the YR-13.

During the 6-week course the Army students received 25 hours of instruction, which the Army considered to be inadequate. In fact, the Army felt that its students who were trained at San Marcos knew little or nothing about the techniques or finer points of helicopter flying. Consequently, the Army established the Helicopter Advanced Tactical Training Course (HATTC) on 1 November 1948 in the Department of Air Training at Fort Sill, OK.

Captain Gaddis set up the flight training course and flight standardized the first Army rotary wing instructor pilots. Those IPs, who had received primary rotary wing training either from the Air Force or Bell, included Lieutenants Rodney J. Collins, Norman Goodwin and Marcus Sullivan, and civilians Charles L. Martin and James K. Knox. They taught the Army's first tactical helicopter training course.

The value of using helicopters to transport cargo (and troops) was brought into full focus during the Korean War. The emergence of Transportation Corps helicopter companies resulted in the need for the Aviation School to train pilots to fly transport helicopters. The result was a course which did not require applicants to have prior aviation training. It was hoped the Air Force would teach the course; but it refused, stating that helicopter flying could not be taught to anyone who was not already a pilot. Bell Helicopter also refused to teach the class for basically the same reason. Consequently, the Army took a bold, unprecedented step and established the course itself. The enlisted portion, which graduated warrant officer aviators, consisted of intensive OCS-type training, to include hazing. There were rigid inspections, and it was not, for example, uncommon to see a candidate standing at brisk attention and continuously saluting a telephone pole while addressing it in the proper military manner.

The course was an immediate success, and when the Aviation School was moved to Camp Rucker it was changed from a section of the Flight Department to a department of its own. Lieutenant Colonel James W. Hill was made director of the Department of Rotary Wing Training at Fort Rucker, and Major Gaddis was his deputy.

Rucker's first helicopter class (ACHPC 55-5)

W/O Jack M. Hendrickson	Sgt Bobby G. Bruce
1st Lt Donald F. Lusk	M/Sgt Robert W. Beechter
1st Lt Willie M. Dixson	SFC Rex C. Flohr
1st Lt Curtis O. Greer	Pvt Charles R. Hall
CWO William L. Ruf	SFC Donald R. Joyce
Capt Glen W. Jones	M/Sgt M.I. Keys
2d Lt Raymond E. Smith	SFC Raymond T. Kline
1st Lt Jack C. Snipes	Sgt Michael J. Madden
M/Sgt Donald C. Beachnew	SFC Eugene E. Price
M/Sgt Henry R. Beau	SFC Lucis L. Share
M/Sgt John F. Williams	M/Sgt Joseph M. Truitt
Sgt Stanton C. Beedy	SFC Jay L. Dugger
SFC L.T. Brown	

Listed above are members of ACHPC 55-5 which on 30 April 1955 became the first to have started training and to be graduated at Camp Rucker.

The OH-23 Raven, primary rotary wing trainer at the Army Primary Helicopter School, Fort Wolters, TX.

FIRST CLASS TO GRADUATE FROM USAPHS
WARRANT OFFICERS

1. Clayton L. Anderson
2. Alvin D. Arrington
3. John A. Banks
4. James E. Beeman
5. Virl A. Black
6. Donald D. Bright
7. Basil B. Catalano
8. James B. Childers
9. Benson M. Collett
10. Gerald H. Dirks
11. Roger L. Eichelberger
12. James A. Godfrey
13. Lawrence C. Hammond
14. Raymond L. Henry
15. Joseph P. Holland
16. Charles R. Honeycutt
17. Carl H. Hunter
18. Martin A. Jetton
19. Lloyd K. Kaul
20. Anthony G. Kusilka
21. Paschal Lentini-Bottey
22. Robert W. Meade
23. John E. Moodt
24. Henry C. Norton
25. James M. Parker
26. James P. Pickel
27. Joseph L.R. Pinard
28. Leslie G. Purdon
29. Royce D. Raley
30. Hu B. Rhodes
31. John W. Schwegler
32. William T. Slye, Jr.
33. Alfred E. Smith
34. Dale L. Stockwell
35. CWO Robert E. Helterbran

As a result of the move from Fort Sill, Army Cargo Helicopter Pilot Course 55-E was cancelled and ACHPC 55-F reported to Rucker on 18 October 1954. It was the first rotary wing class to begin instruction at Rucker and on 30 April 1955 the first to be graduated.

Fort Wolters

The Department of Defense memorandum of 19 April 1956 directing the Army to assume all Army Aviation training, also resulted in the transfer to the Army of Wolters AFB, Mineral Wells, TX, for use as the Army Primary Helicopter School.

The Army terminated its operations at Gary AFB, and 1 July 1956 Wolters was transferred to the Army. Colonel John Inskeep, who had been sent from Rucker earlier to help effect the transfer, assumed command. On 13 July, Secretary of the Army, Wilber M. Brucker, redesignted the post Camp Wolters; on 26 September it became an official Army school (it was made Fort Wolters June 1963).

The first class at Wolters was Army Aviation Transport Pilot Course (Rotary Wing) 57-6, with training conducted in the H-23 Raven. After graduation on 27 April 1957, a portion of this class reported to Fort Rucker for transition training into transport helicopters. The rest was sent to various Army units to fly utility and observation helicopters.

At first Wolters and Rucker each handled half of the primary helicopter training input. But in 1958, it was all turned over to Wolters.

Training at Fort Wolters grew steadily, with 2,120 students in residence by 1966, and it was still increasing. But in 1973, under the plan to consolidate flight training at Fort Rucker, the phase-out was started at Fort

Wolters. The last class there was Initial Entry Rotary Wing Class 74-7/8 which had started training 15 July 1973 and was graduated 15 November 1973. The next classes reported to the Aviation Center.

Helicopter Instrument Program

It was inevitable that a rotary wing instrument program would emerge. By 1954 the Army was experiencing a rising number of helicopter accidents caused by loss of visual reference to the ground. This resulted in an Army policy statement that prohibited helicopters from being flown "unless visual reference to the ground can be maintained."

This was a matter of immediate concern because the new policy was in direct contradiction to the growing hope that the helicopter was the answer to balancing the firepower-mobility scales. To be effective, helicopters had to be able to operate around-the-clock in any part of the world at near zero visibility.

A group at the Aviation School was determined to solve the problem. Major Gaddis, the director of the Department of Rotary Wing Training, appointed Captains Ellis G. (Sam) Langford and Emil E. Kluever to conduct a test and evaluation program to determine the feasibility of helicopter instrument flight. The two really started from scratch, although they had earlier accomplished the Army's first simulated (hooded) helicopter instrument flights. Some instrument work also had been done on a small scale in Korea with H-19 Chickasaws.

After an evaluation, the single rotor H-19 was chosen to be used as the instrument trainer over the tandem rotor H-25 Army Mule, which was not as stable and had too much vibration, making it difficult to read the instrument panel. The first instrument class, consisting of Chief Warrant Officers Clifford Turvey and A.R. Tucker began 3 May 1955. Several others followed and on 16 April 1956, Brigadier General Carl I. Hutton, commandant of the Aviation School, was granted authority to issue helicopter instrument tickets. On 1 May, he presented the first standard helicopter instrument tickets.

A few months earlier, on 19 January 1956, the first actual instrument flight was made by CWO Tucker and Mr. Don G. Clark. It lasted 1 hour and was conducted at various altitudes up to 4,000 feet. Each flew the H-19 (No. 55190) a half an hour and did not experience any serious problems.

As the program evolved, Army regulations were revised in 1958 to allow the operation of helicopters under instrument conditions. Generally, the regulations were reworded to include helicopters. But they specifically made helicopter takeoff minimums lower than those applying to fixed wing aircraft and also lowered minimums at destination and alternate airports.

Meanwhile the first formal Army Helicopter Instrument Flying Course (59-1) started 14 July 1958 and ended 20 September 1958. Its graduates were First Lieutenant Kenneth L. Wenn, Chief Warrant Officers Harold E. Marks, Richard L. Piety, Douglas E. Story and Henry Coleman; and U.S. Marine Corps First Lieutenants Bruce W. Driscoll and David T. Forbes Jr.

Instrument training was conducted with the H-19 Chickasaw until late 1958 when it was replaced by the H-34 Choctaw and H-21 Shawnee. In 1962 those aircraft were phased out and replaced by the UH-1A Huey that was procured in 1959.

Aviation Maintenance Training

At Fort Sill, OK, flight students in 1942 were given 27 half-days of instruction on maintenance and repair of airplanes and engines. All pilots were issued a kit of hand tools and did the maintenance on the aircraft they flew.

LEFT: ***The CH-34 Choctaw transport helicopter***

BELOW: ***The CH-21 Shawnee transport helicopter***

BOTTOM: ***Corporal Beahan (first name unknown), the first WAC (Women's Auxiliary Corps) instructor in the Department of Air Training's Maintenance Division at Fort Sill, OK, explains carburetors to a class of students.***

Student mechanics were selected from Army Ground Forces members who had considerable mechanical experience. After extensive training they were capable of performing all first and second echelon maintenance in the field. The Department of Air Training did not have any trouble filling its mechanics' classes. By August 1942, more than 3,000 applications had been received.

The first Air Force program for providing organizational fixed and rotary wing mechanics' training for the Army was established on 17 March 1948 at Keesler Air Force Base, Biloxi, MS. Among those responsible for setting up this fixed wing course were Mr. Donald McShee (the senior instructor) and Mr. Joseph M. Robinson. The first class began about mid-May with eight students and lasted 13 weeks.

On 12 March 1949, the mechanics' school was terminated at Keesler and resumed on 16 September 1949 at Sheppard Air Force Base. It was at Sheppard in August 1950 that a rotary wing course was developed which closely paralleled the fixed wing program.

The Air Force maintenance training program was shifted from Sheppard to Gary Air Force Base in February 1951, and after a brief interruption classes got underway again 2 March 1951 on an accelerated basis due to the demands of the Korean War. Training continued at Gary until April 1956 when the Army was directed to assume responsibility for all of its aviation training to include maintenance. The phase-out at Gary began that August. Mr. Robinson, along with Mr. P.L. Gary and Mr. W.W. Ford moved to the Aviation School at Fort Rucker which absorbed the program into its Department of Academics.

The Department of Academics, organized at Camp Rucker in September 1955, was an outgrowth of the Department of Aviation Maintenance which was established when the Aviation School moved to Camp Rucker from Fort Sill in 1954. (***Note: Although the Air Force had been tasked with teaching Army organizational fixed wing and rotary wing maintenance in 1948, it could provide it only in the H-13 Sioux and L-19 Bird Dog. That made it necessary for the Army Aviation School at Fort Sill to maintain separate organizational maintenance courses on other aircraft such as the H-23 Raven and L-23 Seminole. These were the maintenance training functions that were moved from Fort Sill to Camp Rucker.***)

Third, fourth and higher echelon maintenance was conducted by the Transportation School at Fort Eustis, VA. The first course of instruction was started within the Transportation School's Aviation Department on 21 June 1954 with the opening of six classes.

Mr. Ronald B. Jackson
Directorate of Training Developments
U.S. Army Aviation Center
Fort Rucker, AL

1. The calm-wind runway may be used when the wind decreases to:

A. 170 degrees at 2 knots
B. 170 degrees at 3 knots
C. 170 degrees at 4 knots
D. 170 degrees at 5 knots

2. You are using runway 27 with the wind 270 degrees at 10 knots. Runway 19 may be assigned when:

A. Wind decreases to 2 knots
B. Pilot requests it
C. Is operationally advantageous
D. All the above

3. A line perpendicular to the runway centerline designating the beginning of that portion of a runway usable for landing is called the:

A. Threshold
B. Threshold marker
C. Perpendicular threshold
D. Runway end

4. What does an X painted on the runway indicate?

A. A displaced threshold
B. Runway closed to air traffic
C. New runway/without markings
D. Caution should be used

5. What does the word STOL mean?

A. Short-field takeoff and landing
B. Short takeoff and landing
C. Specific type of operational landing
D. Simultaneous takeoff or landing

6. A point located on the runway other than the designated beginning of the runway would be referred to as:

A. Threshold
B. Touchdown zone
C. Displaced threshold
D. Overrun of stopway area

7. When providing airport traffic control service, decisions and actions are based on:

A. Observed traffic
B. Local policy
C. Known traffic
D. Both A and C

8. The responsibility to avoid collision in terminal areas, according to Federal Aviation Regulations, rests with:

A. Pilot
B. Controller
C. Both A and B
D. Aircraft owner/operator

9. The statement, "differs from other airport traffic control in that repetitious, routine approval of pilot action is eliminated," best describes:

A. Control associated with radar control
B. Airport without control tower source
C. Tactical air traffic control services
D. Airport preventive control service

10. The minimum information to be exchanged by local and ground controller shall be:

A. Aircraft identification
B. Runway and taxiway
C. Aircraft type
D. None of the above
E. Both A and B

ANSWERS

1. C. FAAH 7110.65c, para 960
2. D. FAAH 7110.65c, para 960
3. A. FAAH 7110.65c, Appendix 4, pg 40
4. B. AIM Basic Flight Information and ATC Procedures, pg 29
5. B. FAAH 7110.65c, Appendix 4, pg 36
6. C. FAAH 7110.65c, Appendix 4, pg 15
7. D. FAAH 7110.65c, pg 125, para 900
8. A. FAAH 7110.65c, pg 125, para 900, NOTE
9. D. FAAH 7110.65c, pg 125, para 903, NOTE
10. E. FAAH 7110.65c, pg 125, para 904

VIEWS FROM READERS

Editor:

While reading in the December issue of *Aviation Digest* I came across your article on NBC. I found it to be very informative. So would you please send me the two previous articles on NBC.

a. "NBC Decontamination Problems," October 81 issue.

b. "NBC Training and Development," August 81 issue.

Your assistance in the matter is greatly appreciated as we can use this information in the NBC school at Schofield Barracks, HI.

SSG Bobby J. Clark
Schofield Barracks, HI

Editor:

Please send us two copies of the article concerning developing a unit program on "Aircraft Battlefield Countermeasures and Survivabilities" (from the April 1981) *Aviation Digest.*

CPT William R. Wieserman
CDR, Det 1, 308th ENG GP
Penn Run, PA

Editor:

The attached poem is submitted for publication. It was written as a personal message to the many young aviators who deserve to know that most of us have been there. I observe young aviators doing things that I have done and survived. I have known a few who are no longer with us.

The old adage, "There is no such thing as an old bold pilot," is true. Survival in aviation should not and does not have to be a matter of luck.

I am the aviation safety officer for Aviation Division, Directorate of Plans and Training, United States Army Infantry Center, Ft. Benning, GA 31905.

C. N. (Whit) Whittle

Editor:

I really liked the series of articles on NBC in your *Aviation Digest* and I am interested in receiving four copies of the articles to disseminate within the unit bulletin boards and key personnel. If possible more copies would be greatly appreciated.

SGT H. Simon
NBC NCO
E Co., 3d Avn Bn (CBT)
APO New York

Editor:

Please send the following articles which have appeared in previous issues of *Aviation Digest:*

Nov 1980—"OPFOR Training" by MAJ R. W. P. Patterson

Apr 1981—"Threat Training" by CPT B. R. Maca and 1LT M. Grablin

Apr 1981—"Special Electronic Mission Aircraft" by CW3 Ed Jones

Thank you for your cooperation.

CPT Kevin C. Peterson
Sierra Vista, AZ

Editor:

In reading the January 1982 issue of *Aviation Digest,* it indicated the December 1981 issue of the *Aviation Digest* had a list of the USAR aviation units in 27 states. The article indicated a copy could be obtained by writing to the editor. If a copy is still available, would you please send me that December 1981 issue?

Mr. William Clark
Raytown, MO

I AM AN AVIATOR

I am an aviator.
I am approaching the most hazardous phase of my flying career, since most human-factor injury accidents occur near the 500-hour level. I am not stupid.
I am an aviator.
I have had close calls and near-misses in the past. I am intelligent enough to realize those were accidents that did not happen. I am not stupid.
I have taken shortcuts in the past, but I am not stupid.
I have done maneuvers in a helicopter that I was not trained to do, but I am not stupid.
I am an aviator.
I realize that I reduce my margin for error everytime I fly outside the aircraft's design envelope, but I am in top physical shape and am always 100 percent mentally alert. I am not stupid.
In the event something does happen to me, I have prepared my wife and family to make it without me!
I am not stupid!

C. N. (Whit) Whittle

Editor:

Regarding LTC Hoyem's letter in the April 1982 issue of *Aviation Digest*, a few observations are offered:

(1) 50 hours of AI time is nigh well impossible for a Cav pilot or even the average UH-1 pilot. A few "old guys" still feel 50 hours AI should be a prerequisite for Master Army Aviator Wings, mainly because they already have their 50 hours and then some; but whenever I try to argue the point they straighten their ties, tuck in their shirttails, brush off their Wellingtons and taxi for takeoff. Would they entertain a proposal to substitute 500 hours of NOE or NVG for 50 hours AI? Master Army Aviator Wings should not be limited to one segment of the Army Aviation force.

(2) I have over 3,000 flight hours so perhaps I can look at the new criteria for Master Wings from a passive stance. The Army is unique in its aviator force in that it consists of those who aviate and those who aviate and administrate. One side cannot function without the other, and the administrating side would probably, as a group, prefer to aviate instead of administrate, given the opportunity to do so. I really doubt that there are many recipients of Senior/Master Wings who aren't extremely close to the elusive 1,500/3,000 hour level in any event.

As a past commander of USAREUR's Safety and Standardization Board, LTC Hoyem should remember that the ability to fly missions never made or broke a unit undergoing an AORSE. That somehow always was subordinate to the administrative side of the house. The criteria for Army Aviator Wings, be they Aviator, Senior Aviator or Master Aviator, has always been tough and I, for one, do not feel they have been cheapened in any way.

CPT Jeffrey R. Murray
Dep Cdr, Contact/Night
Qualification Branch
Lowe Division
Ft. Rucker, AL

Editor:

Request one copy each of the following *Aviation Digest* articles:

"Nuclear, Biological, Chemical Training and Development," August 1981;

"Nuclear, Biological, Chemical Decontamination Problems," October 1981; and

"Chemical Agents, First Aid and Long-Term Effects," December 1981.

MAJ John M. Moerls
Division Chemical Officer
7th Infantry Division
Ft. Ord, CA

Editor:

LTC James Lloyd's article (February 82) on teaching aviators how to fight puts into perspective one of the major problems facing Army Aviation today. Nevertheless, I firmly believe the solutions he suggested will remain only suggestions until the Army faces up to the real issue at hand, which is acknowledging the fact that aviation has grown to the point where it needs to be a branch, equal to the other combat arms.

The Army must establish a sense of belonging, promote esprit de corps and develop the professionalism inherent within the branch concept. Make the Aviation Center the proponent and resource aviation basic and advanced courses. This will fix responsibility for providing the AirLand Battle tactical training.

Well-rounded courses of instruction for SC15 aviators (including SC71, medical and intelligence fields) would better prepare the aviator for his combat mission. At the other combat arms schools, establish aviation teams to teach future ground commanders how to integrate aviation into their scheme of maneuver and fire support plans.

I submit that the requirement for a branch and a single proponent of aviation as a combat arm in the same sense as we now address the other combat arms can no longer be hidden behind the "smoke screen of emotion and passion." We must follow through with the Chief of Staff's decision and concepts of OPMS and Division 86/Army 90 aviation force structure to permit Army Aviation with its expanded technology and inherent flexibility to reach its full potential. It will not be accomplished as long as Army Aviation is fragmented by carrier branches and split proponency.

As MG Galvin succinctly stated during the Army Aviation System Program Review in March 82, "Army Aviation's ability to keep pace today with the realities dictated by an extremely challenging wartime environment falters under management by a system of diffused responsibility."

COL E. Kirby Lawson III
USAREUR Aviation Officer

Editor:

I am presently assigned as the "ALSE NCO" in my unit. I have read "PEARL's" monthly and have found the article to be extremely informative and helpful. I have attended the ALSE school at Chanute AFB and am setting up an ALSE shop.

The reason I am writing is that I'm wondering if it is possible to receive copies of back issues of either *Aviation Digest* or PEARL's articles for reference.

I feel that access to this information is very valuable in placing me up-to-date on the Army ALSE program.

I would appreciate any assistance or information you can supply me.

SSG Chris Reichert
E Co., 1st Avn Bn
Ft. Riley, KS

Correction to May 1982 ATC Action Line:

Under the heading "What would you do?" the sixth bulleted item should have read *Published takeoff (TO)* rather than *Published technical order (TO).*

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362

AVIATION PERSONNEL NOTES

Chemical Corps Moves To Strengthen Officer Inventory

Because of a severe shortage of officers in the Chemical Corps Specialty Corps (SC 74), Military Personnel Center (MILPERCEN) is inviting some officers with an academic background compatible with the Chemical Corps to consider SC 74 as an additional specialty. Individuals so identified will be sent letters of invitation within the next several months.

In the early 1970s, the Chemical Corps was almost disbanded. Many Chemical Corps officers transferred to other officer specialties, and there was a drastic reduction in new officers entering the Chemical Corps. That situation has caused severe shortages of captains, majors and lieutenant colonels.

Increased emphasis on survival and fighting to win on the integrated battlefield has placed a heavy demand upon the small inventory of Chemical Corps officers.

Personnel managers say it will take many years to rebuild the Chemical Corps population to the point where the specialty will be aligned at all grades. Accordingly, there is a tremendous opportunity for qualified officers of other specialties to participate and excel in the chemical field.

Challenging assignments range from battalion, brigades, division or corps to major command level chemical staff officer positions. There are also requirements for platoon leaders and commanders of NBC (nuclear, biological, chemical) defense companies, smoke companies and battalions. About 20 percent of the chemical requirements are research and development, and logistics assignments which encompass the field of chemical engineering, munitions development and production, or materiel acquisition.

MILPERCEN is now in the process of screening officers' academic records in an effort to identify qualified and experienced personnel with a good background to serve in the Army Chemical Corps. Officers who are so identified will receive a letter but must obtain concurrence from their basic branch before any further consideration can be given to accepting SC 74 as an additional specialty.

Questions concerning the program can be addressed to Chemical Branch, Combat Support Arms Division, MILPERCEN, DAPC-OPF-CM, 200 Stovall St., Alexandria, VA 22332, or by calling AUTOVON 221-7314/7432.

Officer Assignment Preference Statement

Assignment officers routinely review officer preference statements when making assignment decisions. It is important that you keep your preference statement current. Many of the officer preference statements, particularly at the grade of lieutenant colonel, are not up to date. Please update your preference statement at least 12 months prior to reassignment or any time you desire to change your preferences.

1982 Schedule of Selection Boards

The 1982 selection boards schedule is listed below. Listed board dates are subject to change.

COLONEL	
SSC	17 Aug— 1 Oct
COL, CA CMD	5 Oct—29 Oct
COL, CSA CMD	13 Oct—29 Oct
COL, CSSD CMD	13 Oct—29 Oct
LIEUTENANT COLONEL	
LTC, CA CMD	2 Nov— 3 Dec
LTC, CSA CMD	2 Nov—24 Nov
LTC, CSSD CMD	9 Nov—24 Nov
CAPTAIN	
CPT, AUS	(To be announced)
MISCELLANEOUS	
DAADB 2d	6 Jul— 7 Jul
RA Board (commissioned officers)	12 Apr—23 Apr
RA Board (ROTC)	(To be announced in November)

Your DA Photo Is Important!

The photograph in your official military personnel file is extremely important! The first item that shows up on the microfiche reader screen during the selection board deliberation is the full-length photo. If you look bad in your photo, you are off to a poor start. If you are overweight or fat, the photo will show it. It might put a negative image on the rest of your file. Your photograph represents *you* before the board.

The board members carefully screen each file. This goes for the photo as well. Some items you should consider when submitting a photo are:

- Does the uniform fit properly?
- Are all authorized ribbons, awards and decorations properly displayed?
- Is the name tag straight?
- Try to have the photo taken in the morning. This is especially important if you have a heavy beard. You don't need a 5 o'clock shadow when you go before the board. If you do have a beard, the board might not necessarily assume it's because of a temporary medical profile. That information isn't in the documents going before the board. That's why many profiled soldiers shave for their official photo.
- Don't wear your uniform to the shooting session. Take it with you on a hanger. This way, you'll appear before the board in a crisply pressed, fresh uniform.
- Winter greens are best for the photo. They hold a crease and hang well.
- Make sure you have appropriate paperwork in your file to support every award and decoration on your uniform. Temporary awards and decorations like shoulder loops and green tabs may not be worn. All ribbons, brass and name tag should look like new. Wear your primary branch brass.
- Do not wear bloused jump boots.
- Have a regulation haircut. Make sure that your hair is neatly trimmed and combed. Trim your mustache, too. Women should not have hair that extends below the bottom of the collar.

As you prepare for your photo, try to place yourself on that Department of the Army panel. Remember, you are not going to be able to personally go before that board. The only way they can see how you look is by using your photo. Officers are required by AR 640-30 to have photographs taken:

- Upon promotion to 1LT or CW2
- Every fourth year—LTC—CW2*
- Every third year—COL and General Officers*

*Periodic photos are taken during officer's birth month. (Information taken from *Soldiers* magazine, March 1982)

Retirement In Lieu of PCS

On 5 March 1982, the Deputy Chief of Staff for Personnel approved a recommendation reducing the retirement application period from 13 months to 6 months for those officers retiring in lieu of (ILO) permanent change of station (PCS). The decision period, time provided for submission of a retirement request, was also reduced from 30 days to 10 days. This change is applicable to officers and enlisted personnel.

Under the new policy a servicemember must have 19 years and 6 months AFS (active federal service) at the time he is placed on orders to qualify for retirement ILO PCS. Servicemember must request retirement not later than 6 months from the date of notification. The decision period, 10 days, is included in the 6-month retirement window.

The implementation date for this change was designated as 1 June 1982. AR 635-100, "Officer Retirements, Resignations and REFRADS," has been revised to include this change. A FOCUS article is being prepared which discusses this change. Point of contact is MAJ Hodge, AUTOVON 221-0686/9421.

Specialty Code 28

On 22 December 1981, the director of the Army Staff approved the proposal that Training Development be eliminated as a separate specialty code (SC 28) and converted to additional skill identifier (ASI) 7Q. Some of the training functions of SC 28 will become a portion of SC54, Operations, Plans, Training and Force Development. Records of officers holding SC 28 are being reviewed by the professional development branch to determine a new specialty. Only those officers with training experience will be considered for SC 54; all others will be given an additional specialty (ADSPEC) based upon their experience, their desires and the needs of the Army. CSSD officers possessing SC 28 as an ADSPEC should contact their respective professional development officer at AUTOVON 221-9697.

Sequencing of Specialties on Your ORB

You will note that your specialities are listed in numerical order on your Officer Record Brief. This change was made to indicate that there is no primacy among specialties. Does this mean that the branch that manages your file has changed? NO! Your control branch is listed at the top center of your ORB and that is the branch that does indeed control your file. In other words, "Business as usual."

REPORTING FINAL

Late News From Army Aviation Activities

FROM WASHINGTON

Teaming Agreement. Bell Helicopter Textron and Boeing Vertol Company have announced a teaming agreement to participate in the U.S. Government's Joint Services Advanced Vertical Lift Aircraft Program (JVX) competition.

The JVX is being formulated to provide a significant improvement in the vertical lift capabilities of all the military services. It is anticipated that a Request for Proposal will be released to industry in September for a detail design definition phase. Full-scale engineering development would be authorized in late 1983 with first flight scheduled in mid-1986. Production deliveries would begin in the early 1990s.

(Bell Helicopter Textron PAO)

Attention Parachutists. Tryout selections for the Golden Knights' 1983 demonstration season will be held 27 September to 5 November at Ft. Bragg, NC. Applications may be obtained by writing or calling the commander, U.S. Army Parachute Team, ATTN: Tryout NCOIC, P.O. Box 126, Ft. Bragg, NC 28307, AUTOVON 236-4800/4828 or commercial (919) 396-4800/4828.

(ARNEWS 288)

photo by SP4 Yvonne Lugo

A record. Five members of Cairns Division, Department of Flight Training, Ft. Rucker, AL, have received Master Army Aviator Wings. Recipients and their flight hours are Chief Warrant Officer, CW2, Gregory A. Eastman, 4,800; MAJ Warren W. Spencer, 4,560; LTC Robert R. Parks, 2,200 and 108 total operational flying duty credit months; MAJ Larry Hester, 3,980; and Chief Warrant Officer, CW2, Ronald C. Gibes, 4,500. They form the largest group of aviators to be awarded Master Wings at one time, while in the same unit.

Perfect Student. Chief Warrant Officer, CW4, Michael L. Talton, left, Distinguished Graduate of the Warrant Officer Senior Course which graduated 3 June at Ft. Rucker, AL, finished with a 100 percent class average. Only three previous students have maxed the 22-week course. With him are his fiancee Lydia Araujo and the guest speaker for the ceremony, LTG Richard H. Thompson, the Army's deputy chief of staff for logistics

Reading his story. COL David L. Funk reads his article in the April issue of *Army Aviation Digest*, published at Ft. Rucker, AL, where he is the Army Training and Doctrine Command systems manager for attack helicopters. For writing "The Attack Helicopter School and Center of the Future," he was presented the *Digest* monthly writing award for April, consisting of an *Aviation Digest* Certificate of Achievement and an engraved pen from the Bogardus S. Cairns Chapter, Association of the U.S. Army

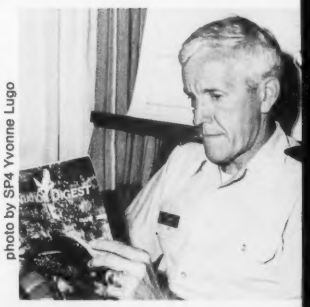


photo by SP4 Yvonne Lugo

New Warrant Officer MOS. A new Warrant Officer Occupational Specialty (MOS) for air traffic control (ATC) technicians has been approved by Headquarters, DA, and will become effective 1 September.

The 150A specialty will require supervising and managing ATC personnel as well as all categories of Army ATC facilities, including training and certification programs.

Applicants must have graduated from a military ATC school and must possess an ATC specialist certificate (FAA Form 7220-1) with a facility rating in either tower or radar ATC operations.

More details on this MOS will be published in Change 7, AR 611-112. **(ARNEWS 314)**

FROM FORT BRAGG

Safety Winner. The FORSCOM Commander's Award for Aviation Accident Prevention for fiscal year 1981 has been won by the 1st Squadron (AIR), 17th Cavalry; and this is the second consecutive year it has received the trophy for a battalion-size unit.

There were no injuries, fatalities or accidents sustained in the 13,083 hours flown by 1/17th aviators in Cobra and Black Hawk helicopters in FY 1981. **(82d Airborne Div PAO)**

LISTING OF ARMY AVIATION NATIONAL GUARD UNITS

ILLINOIS

Chicago
Det 1, Co C, 47th Avn Bn
National Guard Armory
5400 West 63d Street
Chicago, IL 60638
Comm: (312) 767-9265
AV: 459-2200

Decatur
Co C (—), 47th Avn Bn
National Guard Armory
402 East Eldorado Street
Decatur, IL 62523
Comm: (217) 423-2084
AV: 555-3618
Det 1, Co D, 47th Avn Bn
402 East Eldorado Street
National Guard Armory
Decatur, IL 62523
Comm: (217) 423-2084
AV: 555-3618

IOWA

Boone
(Member of Minnesota ANG)
HQ, 248th Avn Bn
1064th Trans Co (AVIM)
Det 2, Co A, 47th Avn Bn
CPL Snedden Drive
Boone, IA 50036
Comm: (515) 432-6351
AV: 946-2388

Davenport
(Member of Minnesota ANG)
Co B, 47th Avn Bn
National Guard Armory
RR #3 Municipal Airport
Davenport, IA 52804
Comm: (319) 391-3635
AV: 794-4733

Waterloo
Trp D, 1/194th Cav Sq
2245 West Big Rock Road
Waterloo, IA 50701
Comm: (319) 233-0901
AV: 946-2387

MINNESOTA

Saint Paul
HQ, 47th Avn Bn
Downtown Airport
National Guard Hangar
Saint Paul, MN 55107
Comm: (612) 296-6489
AV: 825-6489

HQ and HQ Co, 47th Avn Bn
Downtown Airport
National Guard Hangar
Saint Paul, MN 55107
Comm: (612) 296-0114
AV: 825-0114

Co A (—), 47th Avn Bn
Downtown Airport
National Guard Hangar
Saint Paul, MN 55107
Comm: (612) 296-0112
AV: 825-0112

Co E, 47th Avn Bn
Downtown Airport
National Guard Hangar
Saint Paul, MN 55107
Comm: (612) 296-8129
AV: 825-8129

47th ATC Platoon
Downtown Airport
National Guard Hangar
Saint Paul, MN 55107
Comm: (612) 296-0114
AV: 825-0114

PENNSYLVANIA

Harrisburg
Det 2, 136th Trans Co
(Med Hel)
21st and Herr Streets
Harrisburg, PA 17103
Comm: (717) 787-1072 (Unit)
(717) 787-8694 (Flight
Facility)
AV: 235-2714
(Operations)

TEXAS

Dallas
136th Trans Co (—)
Dallas NAS, TX
Comm: (214) 263-8741
(214) 266-6565
AV: 874-6565

Houston
Det 1, 136th Trans Co
Houston-Ellington AFB, TX
Comm: (713) 481-1400 Ext
2355

WISCONSIN

Madison
Co D (—), 47th Avn Bn
National Guard Armory
1952 Pearson Street
Madison, WI 53704
Comm: (608) 241-6353
AV: 273-9386

Other units are invited to submit their lists for publication

CBAA TESTING PERIOD FINISHED

OPERATIONAL tests of the 9th Cavalry Brigade (Air Attack) (CBAA) have been completed at Ft. Lewis, WA.

The most significant aviation project since the air assault tests in the 1960s, the CBAA concentrates all division aviation assets under one brigade headquarters, making them more responsive to the division commander and the overall mission accomplishment. See the December 1981 *Aviation Digest* for an indepth report by Colonel Thomas H. Harvey Jr., 9th CBAA commander, on the unit's evolution, structure and mission ("Mission First," pp. 41-45).

Testing was conducted intermittently from February through May 1982 and escalated from sub-unit evaluations through division field training exercises in a European and a Mideast scenario. Objectives of the tests were to ascertain the command and control capabilities of the CBAA, to validate its ability to act as a fourth maneuver brigade, and to check the organization's logistics and administrative structure. According to test officials, only a few problems were found that will require changes to the CBAA to make it more fully operational.

Colonel Harvey said he was "delighted but not surprised" at the success of the tests.

He added: "It has been evident to all of us who have been involved with the CBAA that it is the most efficient means—looking at people, money, time and materiel—to provide a force multiplier for the Army's divisions. Additionally, the brigade will give the division commander the needed capability to execute the AirLand Battle concepts, such as deep strike."

Photographs by Barry Dowell, Bob Nessom and Dave Schad record some activities during the operational tests of the 9th CBAA, clockwise from below: Two OH-58 Kiowas and three AH-1S Cobras rise from their staging area and depart to engage the enemy at Yakima Firing Center; In the final test exercise for CBAA, 222,363 gallons of helicopter fuel were pumped at several FARPs which were relocated every 3 to 6 hours to reduce enemy target opportunities; An Air Force A-10 and an Army AH-1S work together on a Joint Air Attack Team; Soldiers wait to board a UH-60 Black Hawk; A CH-47 airlifts a UH-1H to simulate major repair work done in the rear battle area.

U.S. Army Communications Command
ATC ACTION LINE

The Go-Around—Lifesaver Or Killer?

Kenneth S. Arnold
U.S. Army Air Traffic Control Activity
Aeronautical Services Office
Cameron Station, Alexandria, VA

ALL AVIATORS will remember their primary flight training instructors' words which always came early in the game, "When it doesn't look right, GO AROUND!"

In some cases, the student pilot became acquainted with the go-around on his first training flight. In all cases, he was familiar with it and thoroughly convinced it was a lifesaver before he soloed. In those early days of the training phase most go-around situations were generated by the student pilot himself, i.e., improper approach procedure or aircraft preparation. As the student accumulated more experience, this particular type of go-around became less frequent, and soon, to make a go-around was damaging to one's ego. Additionally, although a go-around is a "no sweat" maneuver which is neither difficult nor demanding, the normal flight crew reaction is annoyance at the waste of time, fuel and effort in pulling out of the approach with the expectation of a long resequencing procedure—especially at busy airports.

A little later in the aviator's career he graduated into the world of IFR, TCAs, TRSAs, etc. At the same time he became aware of near-misses, OHRs and the required evasive actions. The go-around also graduated from the self-induced to the conflict generated type. Since go-around maneuvers happen fast, at low altitude, and within the confines of the terminal area, the cause and effect relationships that trigger the conflict situations remind one of the so-called domino effect. Here's where the old reliable go-around becomes a potential killer!

Reports received by National Aeronautics and Space Administration's aviation safety reporting system frequently portray go-arounds as avoidance or evasive actions to break away from traffic conflicts. Sometimes these go-arounds channel aircraft immediately and precipitously into conflicts with other aircraft in the airport traffic area. In this respect, the go-around becomes a transition phase—from the flying pan into the fire! As a matter of fact, review of the NASA reports discloses that one-third of the conflict generated go-arounds developed immediately into additional midair conflicts, of which one-third could be classified as near midair collisions.

The number of conflicts occurring in the go-around phase suggests the possibility that in VMC conditions air traffic controllers were conditioned by habit to expect the continuation of aircraft approaches into completed landings. Unexpected go-around sometimes resulted in hasty, unplanned or incompleted coordination reactions. Three examples given by NASA's latest quarterly report follow:

"I watched on radar as an air carrier on a go-around merged with another aircraft that was departing off runway 04. Apparently no separation was being exercised. Then they dumped them both on to my frequency; both pilots were somewhat mad, to say the least."

"We were advised we were overtaking traffic and told to climb out to 3,000 feet. At 1,800 feet, we broke out of some rain showers, found ourselves head-on with another aircraft at our 12 o'clock position. I feel no provision was made for a go-around in the controller traffic picture."

"At approximately 600 feet the captain spotted the aircraft on the go-around. He was about 500 to 600 feet away and converging on us. We leveled off and then noted the other aircraft make an abrupt upward pitch change indicating they had seen us. They then passed over us."

As indicated in these examples, a normal lifesaving go-around can become a killer when the two broad major conflict causing factors are involved simultaneously. These broad classifications are human behavior factors, such as distraction, worry, anger, pressure, complacency, or even the pressing requirement for restroom facilities, and, the coincidental presence of operational situations or flight activities involving adjoining parallel runways, aircraft performance mix, training aircraft on opposite-direction practice instrument approches, pilot use of back course ILS localizer approach, and nearby peripheral airports.

Throughout all conflict reports, at all types of airports, and in all types of airspace, were threaded the limitations and fallibilities of both flight crew and controllers. The human factors identifiable in the go-around incidents are varied, diverse and further verify the cliche that we are our own worst enemies!

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

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Threat:
Helicopters—The Soviet View
CW4 Richard H. Davis

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Who's Going To Teach
Aviators How To Fight
LTC(P) James W. Lloyd

March

Give Us Our Guns And Optics
1LT Ronald M. Buffkin

April

The Attack Helicopter School
And Center Of The Future
COL David L. Funk

May

From Routine To Near Disaster
CW3 Robert A. Stolworthy

June

Grasshoppers
BG William W. Ford (Ret.)

July

Hangar Talk: The FLIP and
Aeronautical Charts
CW2 Gary R. Weiland

August

Aviation Warrant Officer
Retention: A Matter of Concern
CW3 Carl D. Everhart and
Michael G. Sanders, Ph.D.

September

AWO Retention,
The Factors Which Influence
The Decision To Leave
MAJ Gordon L. Rogers and
CW2 Orion T. King

October

Smart Guys Win:
The Thinking Man's Guide
To Helicopter Aerial Combat
MAJ Michael L. Brittingham

November

Army National Guard Aviation
John J. Stanko Jr.

December

AWO Retention,
A Matter Of Action
COL George A. Morgan and
CW4 Kenneth M. Johnson

1st LTC (P) James W. Lloyd

2nd CW4 Richard H. Davis

3rd BG William W. Ford (Ret.)